WATER RESOURCES

THE UNIVERSITY
OF MICHIGAN

FEB 25 1960

MAIN
READING ROOM

HEARINGS

BEFORE THE

SELECT COMMITTEE ON NATIONAL WATER RESOURCES

UNITED STATES SENATE

EIGHTY-SIXTH CONGRESS

FIRST SESSION

PURSUANT TO

S. Res. 48

HURON, S. DAK., OCTOBER 27, 1959
SIOUX FALLS, S. DAK., OCTOBER 28, 1959

PART 6

Printed for the use of the Select Committee on National Water Resources

UNITED STATES
GOVERNMENT PRINTING OFFICE
48186 WASHINGTON : 1960

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WATER RESOURCES

TUESDAY, OCTOBER 27, 1959

U.S. SENATE,
SELECT COMMITTEE ON NATIONAL WATER RESOURCES,
Huron, S. Dak.

The select committee met at 9 a.m., pursuant to Senate Resolution 48, in the Elks' Lodge room, Marvin Hughitt Hotel, Huron, S. Dak., Senator Robert S. Kerr (chairman) presiding.

Present: Senators Kerr, Hart, and Case.

Also present: Theodore M. Schad, staff director of the select committee, and Paul McBride, chief clerk.

The CHAIRMAN. The Senate Select Water Resources Committee is very happy to spend today and much of tomorrow in South Dakota.

One of the most distinguished members of this committee is one of your Senators, Senator Francis Case, who is one of the foremost authorities on water resources, their conservation and utilization, that we have in the Senate. He has either sponsored or jointly sponsored some of the most important legislation on the development of the Nation's water resources for more than a decade. We are glad also to be in the State of his distinguished colleague, Senator Mundt, who is one of the most able Members of our body.

I want the record to show, Senator, that I am not making a Republican speech but if South Dakota insists on being represented by Republicans in the U.S. Senate I don't know how they could do as well as they are now doing. I really don't.

This committee is seeking information as to the specific needs of our country for additional water resources in the next 20 years and how those needs can be met.

We are told by our census experts that our population will increase astoundingly in the decades ahead, that our gross national product, now hovering near the $500 billion per year mark, will double in less than 20 years, and we know that in order for that very much desired situation to develop we are going to have to utilize tremendously increased volumes of water. We think that this amazing growth of population will occur, and we think that this tremendous increase in industrial and agricultural production will also occur in the areas where the water is available to be captured for use and utilized for these two great purposes. We are now seeking answers to many questions. How much water development is needed in our country to take care of these requirements, when is it needed, where is it needed, what should be the pattern of water development, and what levels of cost and expenditures are justifiable for future water development?

We are happy that here with us today is one of the distinguished Senators from Michigan, Senator Hart, who has indicated that one

of the primary interests he has in his work in the U.S. Senate is a more aggressive program of water capture, conservation, and utilization.

I am going to tell you gentlemen confidentially, and I hope you don't use it adversely to him, that Senator Case spent yesterday with me up at Faulkton hunting this elusive fowl that may not be the State emblem of South Dakota, but it is one that I associate with it—what do you call it—pheasant—pheasant? I want to tell you he is better than a green hand at that job. It was my pleasure to be here with him last year some 2 or 3 days, hunting pheasant. And he decided that if he ever got to the point where he felt that the burdens of the office he now holds are greater than he would want to bear, his efficiency in the matter of getting these pheasant is such that if it were to be commercialized, he could make more money doing that than the meager salary accorded a U.S. Senator.

Now, if you have a statement, Senator, we will be glad to have it, and such witnesses as you have to call.

STATEMENT OF HON. FRANCIS CASE, U.S. SENATOR FROM THE STATE OF SOUTH DAKOTA

Senator CASE. Senator Kerr, Senator Hart, first of all, let me say that we consider it a privilege and an honor to have you in the State of South Dakota. We are concerned with water problems in South Dakota and we do not consider them politically involved at all. Water is a matter that concerns everybody, be he Democrat or Republican. I never expect you to come to South Dakota to make a Republican speech—you are welcome here any time you want to speak, whether it be a Democratic or a Republican speech. As a matter of fact, we discovered in recent years we have some Democrats in South Dakota, too, so you don't need to feel particularly lonesome.

It is true that the Senator comes from Oklahoma to South Dakota occasionally to hunt pheasants. He really knew what the name of the bird was. That is just one of the little tricks he has. I have heard him on the floor of the Senate, I may say to the people present, when he wants to emphasize a point he will make a speech referring to the President of the United States, for example, and then he will pause and hesitate and can't think of his name and lean to the person next to him and say "What is the name of that fellow down there at the White House?"

Before you leave Huron, Senator Kerr and Senator Hart, I hope that both of you will go up here on the new highway and see the big pheasant that was dedicated here just about 10 days ago by the junior chamber of commerce. It is the biggest bird, I suppose, in the world. At least we think it is. It will be known as Mr. Big Pheasant for years and years to come.

The matter of water is one of great concern to our State. All the time that I have been associated with public office, we have regarded the development of our water resources as of primary importance.

The local paper last night, the Huronite and Daily Plainsman, had an editorial in which it said that without doubt water was the most important resource and the most important problem in South Dakota now.

So we feel it is highly appropriate that this select committee should visit our State. We are honored by your presence. We hope that the needs of South Dakota, as far as water is concerned, will be taken into consideration by the Senate select committee in its report seeking to develop a national water policy.

Now, the evidence that this is a national problem is the fact that we have here such Senators as the distinguished Senator from Oklahoma, who is the chairman of the Senate Subcommittee on Flood Control and River and Harbor Development. Further evidence of the national character of this problem is the fact that Senator Hart, who comes from what we regard as an industrial State with some large municipalities is here, too, evidencing his interest in this matter of water. From Huron we are going to Sioux Falls for a hearing there and then the committee goes to Detroit, Mich., where they also are acutely aware of the water problems in our developing economy. So it is a national problem. We are glad to have you here.

Today we have representatives from many groups in the State. I have a list of witnesses which has been gathered of those who have indicated a desire to speak and we will call on them substantially in the order in which they have been listed here.

If there are any present whose names we do not have or we do not call upon, please feel free to speak to one of the clerks or to me and we will see that your name is added to the list. It is possible that there will be some here who are representing agencies of the State, county or National Government, who may not desire to speak, but whose presence should be recorded as evidence of the widespread interest in that matter.

Do not hesitate to make yourself known and the opportunity will be given for you to at least give your name and the agency you represent.

Without objection, I will insert in the record at this point an article entitled "Water—An Important Food" which appeared in the September 1 issue of the Hereford Journal, which points up the importance of water in the raising of livestock and poultry.

(The letter and article follow:)

THE AMERICAN HEREFORD JOURNAL,
Kansas City, Mo., October 15, 1959.

Hon. FRANCIS CASE,
U.S. Senate,
Custer, S. Dak.

DEAR SENATOR CASE: In response to your inquiry of October 5, we are happy to extend our permission to insert the article on "Water—An Important Food," by J. Robert Walker, into the record, to which your letter refers.

Sincerely yours,

DON R. ORNDUFF, *Editor.*

Water—An Important Food

(By J. Robert Walker)[1]

Water so often is taken for granted that we seldom stop to appreciate its importance in our lives and for our animals. Commonplace things often are the least appreciated and the hardest to understand.

You have heard the saying: "You never miss the water until the well runs dry," although the expression is usually applied to some other idea. Yet if you have ever experienced the fact of the statement, you can appreciate its meaning in full.

Many have known only too well the difficulties in getting enough water for irrigation, supplemental water supplies, or the lack of good water for house, stock, garden, and crops. They have experienced the worries of dry wells, failing springs, something going wrong with the water system in the dead of winter, the fury of floods and evils of erosion. Farmers have had to haul water for their animals in trucks from the cities, and some cities have had to haul water from farm ponds.

THE MOST ABUNDANT INGREDIENT

Water is by far the most abundant ingredient of the human body at every stage in development. A loss as little as even one-tenth of the water from the body brings death.

When we are thirsty, we can manage to find a refreshing drink from a nearby faucet. Not so with our farm animals. Water must be provided them—cool water in summer and not too cold in winter. Few animals or birds are lost because of lack of water except under unusual conditions of drought, but the loss in potential gains is tremendous.

An adequate water supply is one of the first needs for a profitable livestock operation. To point up how great is this need, one researcher has reported a demand for 15,000 pounds of water as needed to produce just the grain it takes to produce 1 pound of beef. Another has said it takes 40 gallons of water to grow feed to produce one egg.

Larro Research Farm scientists working with broilers, layers, turkeys, sheep, swine, dairy and beef cattle have learned that water has been one of the most underrated feeds.

Many things influence the intake of water by livestock. In a general way, water goes along with the consumption of dry matter in the feed when animals are on dry feeds. Cattle and sheep drink 3 to 4 pounds of water to each pound of dry matter. Pigs, horses, and fowl consume about 2 to 3 pounds of water per pound of dry feed. Of course, the water content of the feed itself will influence the amount of water consumed.

SOME STEERS TAKE 10 GALLONS DAILY

The level of production affects water consumption. Steers on maintenance rations average a consumption of 36 pounds of water a day (4½ gallons); on fattening rations it is about 72 pounds. Fattening beef calves drink 6½ to 8 gallons daily while older steers and brood cows will take 10 gallons.

Dry Holstein cows take in about 90 pounds of water a day. When producing 20 to 50 pounds of milk a day, they may drink as much as 160 pounds of water a day. A cow needs 3 to 5 pounds of water for each pound of milk produced.

Dairy cows like their water often. They will average about 10 drinks each day if they have free access to it. In a controlled test, when drinking cups were attached to stalls, it was found that milk cows drank 18 percent more water than before the cups were installed. The added water, available when the cows wanted it, increased both the milk and butterfat yield.

Water consumption is cut sharply by low temperatures. As temperatures rise, water intake increases rapidly. Pigs supplied water continuously at 45° F. gained 10 pounds more in 6 weeks than pigs hand-watered twice daily. This test was made in weather cold enough to freeze water. One hog producer figured he sold water for $1.25 per gallon, through his pigs. He found his 200-pound market hogs averaged 5 percent more water than the reported average 53 per-

[1] The accompanying article appears through the courtesy of the Young Farmer and General Mills, Inc. The author is research editor, Larro Research Farm.

cent water for hogs. At the market price for pork he realized $1.25 per gallon for that extra water.

A hog drinks 1 gallon of water to make 1 pound of gain. Feed costs go up when the amount of water consumed goes down. Tests have shown that animals limited by 25 percent of the maximum amount of water they would normally consume cost 25 percent more to produce per 100 pounds of gain. This might mean that hogs short 25 percent on water would cost as much as $4 more per hog at market weight—and there goes your profit.

A baby chick is more than 80 percent water during the first 48 hours. If it does not get sufficient water, it will become dehydrated and die. When the chick becomes a hen, it is about 55 percent water. The eggs it produces are 66 percent water including the moisture in the eggshell or 75 percent moisture without the shell. Young birds have a higher body water content than older birds.

The water consumption of mature pullets is about 3 to 4 gallons a day for each 100 birds. One hundred laying hens need 5 to 7 gallons of water per day. Turkeys may be drinking 1 gallon per bird per week after about 14 weeks of age. Environmental temperatures, however, may change these figures of water consumption. Water consumption of layers at 90° F. is approximately twice that at 70°. At 100°, it is about three times as much as at 70°.

Without good water located near feeding racks, troughs, bunks, or on pasture, the production of milk, meat, and eggs from our animals and birds will go down. With adequate water readily available, production increases, cost per unit drops, and profits rise.

Mr. Chairman, this morning we are also particularly honored, I think, to have the social science class from the high school here, and they have rather modestly taken the rear seats in the room, but their presence should be noted. I think it is a fine thing that this group should be here, too, to witness a Senate committee in action at a hearing like this.

Senator Hart, did you want to say something?

Senator HART. Thank you. No, except to express our appreciation for the hospitality of last night and today.

Senator CASE. I heard several accolades about the hospitality of the junior chamber last night, that pheasant dinner that Senator Kerr and I did not get to enjoy. But we were trying to insure that some friends of his, including his sons and some of his business associates from Oklahoma, and the Governor of Tennessee, would have an opportunity to enjoy some South Dakota pheasant when they got back to Tennessee and Oklahoma, respectively, and in that I might say we were reasonably successful.

Now, to start the hearing this morning, we have a representative of the Governor of South Dakota. Gov. Ralph Herseth expects to be with us at the Sioux Falls hearing tomorrow, but today he sent here his personal representative and representative of his own office, the State engineer of the South Dakota Water Resources Commission, Mr. Joe Grimes.

The committee will be pleased to hear him at this time.

STATEMENT OF J. W. GRIMES, STATE ENGINEER OF THE SOUTH DAKOTA WATER RESOURCES COMMISSION

Mr. GRIMES. Chairman Kerr, Senator Case, Senator Hart, my name is J. W. Grimes. I am chief engineer and executive officer of the water resources commission. I have with me a number of charts because I thought perhaps the committee would like to have as a beginning to these hearings an explanation from those charts as to the water

supplies which we have in South Dakota, how we have used them, what their possibilities are, and the development which we would like to see in our State.

If I may, I would like to present that background from the charts?

Senator CASE. Yes, I think that would be very helpful.

Mr. GRIMES. This first chart that I have shows uppermost of our deep artesian ground water that is available in the State. It has been used ever since the State was settled for domestic and stock water, and many of our smaller communities use this water supply. This is the uppermost of the artesian aquifers. Under this layer, which is about elevation 300 feet above sea level, there are perhaps four or five other separate artesian aquifers also. But this upper one represents the one which is most used in the State at the present time and has been developed to the greatest extent. I might say now that it has in the early years from about 1900 to 1915 actually been overdrawn, but this aquifer has reached an equilibrium condition now and we find the loss in head each year is very slow at the present time. It is, however, considerably less pressure than it used to be.

The white areas on the map are those locations in the State where this particular aquifer will flow if wells tap that source. The grayer area——

The CHAIRMAN. In order to give me a little better orientation, where is Huron, and where is Pierre?

Mr. GRIMES. Pierre is here. Here is Huron. And this is the Missouri River as it goes through South Dakota.

The CHAIRMAN. Isn't there any connection between this and the water flowage of the Missouri?

Mr. GRIMES. No, the mere fact that we have greater pressure on this aquifer means that the overlying formation of the aquifer is so tight that that pressure cannot go through with it. The reverse is true. Missouri water or surface waters of the State will not penetrate in that aquifer. The white area, as I mentioned, is that area which will also tap in this aquifer and will flow.

The grayer area represents the area in the State in the aquifer where, while the water will rise a considerable distance in a well tapping the aquifer, the water has to be pumped.

The black crosshatched areas are those areas in the State which represent intrusions and there is no deep water in these locations.

Senator CASE. It is not, Mr. Grimes, that those black crosshatched areas are collecting areas?

Mr. GRIMES. No. This black area over here is a rock intrusion.

The CHAIRMAN. It is up thrust, is it not?

Mr. GRIMES. Yes. And it is solid, very dense rock. Sometimes, if a person is very lucky, he may get fissures in that rock, he may get well supplies. Normally you cannot get them. The same thing is true in the Black Hills. This represents the granite area of the Black Hills. That up thrust which formed the hills and water supplies cannot be obtained from wells in that area.

These water supplies, while they have been extensively used and still are, is a brackish water. The total dissolved solids in this water supply runs about 2,000 parts per million, plus or minus a little bit, depending on where you are in the State. As you go deeper into the other aquifer the general relationship is that the waters are more salty

from the deeper aquifers than here. And other aquifers underlying this one that have been tapped for use have total dissolved solids in the neighborhood of 3,000 parts per million. These are the saline waters.

Here just last week the selection Committee of the Office of Saline Water of the Secretary of the Interior's Office was here looking at three towns in South Dakota for the installation of the saline water desalting plant.

Senator CASE. Mr. Grimes, for the record, I am merely asking this question. Would you indicate what a hardness of 2,000 to 3,000 parts per million, which you indicated this water has, means in terms of the acceptability for industrial or domestic use?

Mr. GRIMES. Well, it is a water which is tremendously expensive for the housewife to use soap for domestic use. It is not in most cases actually harmful. We do have in this part of the State an overdissolved portion of fluoride and long-term residents of the State have a characteristic brown stain across their teeth. It comes from those water supplies. Otherwise it is not a harmful water. One of the things about it is it cannot be used for irrigation purposes. It is difficult to handle in the way of treatment. Softening, for instance, is a very expensive thing. It will deposit very salty substances of various colors, I might say, inside the water use pipes. It is not so much this aquifer but others. We have a number of cases where some of our shallow or ground waters which I will show on our next chart has been contaminated from these salts from these wells through failure of artesian wells in the past.

Senator CASE. The Division of Saline Waters in the Department of the Interior has received examples of pipe from some of the towns, notably Pickstown, I believe, showing how the deposits inside the pipe in a few years greatly restrict the flow of the pipe in some of the communities. That had to be replaced.

Mr. GRIMES. Yes, it is difficult.

Senator CASE. They have to be changed frequently, from 4 to 6 years.

Senator Kerr says that is a case of hardening of the arteries.

Mr. GRIMES. Senator Kerr, I am an engineer by training and water rights is the business which I handled for the State. I figure I am a public relations man in part and also a lawyer but I have not got to that doctor's certificate yet.

The CHAIRMAN. I don't have it either. But I don't permit that to limit the play of my imagination. And doctors talk to me about cholesterol, which seems to be an instance of when a man eats what he wants to eat, it brings about an accumulation inside the artery of substances which clog it up, as evidently these particles do the pipe, and by reducing the space in which the blood can flow compels the heart to have to work that much harder to get it out where it has to be. That is the situation which brings on the condition that we men with a large girth try to avoid. It might be that a desalination program of this kind would be in order. I am very interested in what you are talking about.

Mr. GRIMES. I imagine that a number of our smaller towns use this water supply for their public water supply. The larger towns in the State, however, have gone to other sources. I think as much as any-

thing else the extreme cost of treatment in most of the small towns, and they, as do the rural areas, use the water additives.

Senator CASE. Just in passing, Senator Kerr, while they are changing the charts, I wish to say that this afternoon it is our plan to go to Redfield, which is a short distance north of Huron, and there see a demonstration put on by the Ionics, Inc. people, at the plant for the desalination of that water.

As you can see by the broad extent of that aquifer, the desalination of that water successfully and economically would mean a great deal to the State of South Dakota.

Mr. GRIMES. We perhaps have a couple hundred communities in South Dakota that use that water.

This chart represents our known shallow ground water supplies. By shallow I mean those which can be attained at depths of 200 feet or less. The blue shading that we have marked on the map represents those areas in the State where water supplies of perhaps 30 gallons per minute or more can be obtained and it does not show the lesser areas where rural domestic water supplies can be attained.

In the eastern part of the State these shallow ground water supplies are the old glacial melt water channels. Those constitute the sandy gravels in which this water is.

The Missouri River, as you know, represents almost entirely the southwestern boundary, through South Dakota of the old glacier intrusions. As a consequence we have a great difference of soils on the north side of the river as compared to the south side and fingering through these glacial soils are these shallow ground water supplies. This has been extensively tapped, especially during the last 4 years, for irrigation water supplies. Some of these particular areas are quite prolific in their production of water up to 2,000 gallons per minute, perhaps.

We have one characteristic. Huron is located right here. As perhaps you will hear from the city representatives, they are having municipal water supply difficulty. North of Huron is quite a shallow artesian aquifer. But that is one of the areas that I mentioned when we were looking at the other chart. One of the areas where we are quite convinced that the relatively fresh, good water of these shallow aquifers has been contaminated by the salty water from the artesians. Many artesian wells built in the past and through the years have filled. It is mixing those waters. As a consequence they have, especially in the lower end of this lobe of this shallow aquifer near Huron resulted in a salty condition in those waters, as well as in the deep waters. We have a few other local instances where the waters are too salty for irrigation use. But otherwise the surface has a good water supply. It is not fully tapped or fully developed at the present time. We will find, I am sure, as time goes on, that local people will develop these kind of water supplies in South Dakota for irrigation and other purposes.

Incidentally, I forgot to mention some of the material I put on this map. Just for reference purposes, can you see the yellow line? Those yellow lines represent average annual precipitation in South Dakota. We start out here in the southeastern part of the State and this line represents 28 inches, 24 inches goes across this corner of the State and the 20-inch rainfall belt goes up just about the 98th meridian. As a matter of fact, the 98th meridian in South Dakota comes right through here, a few miles east of Huron.

Senator CASE. That marks the western end of the 20-inch rainbelt?

Mr. GRIMES. Yes; through South Dakota, speaking a little generally, yes, because the line actually goes diagonally. But that represents the 20-inch rainfall in South Dakota.

When we go over to here we are down to 6 inches.

Senator CASE. When you say "here," for the purpose of the record would you indicate?

Mr. GRIMES. Well, when we get to roughly the Big Bend area of the Missouri River we have, north and south through that point, roughly, the 16-inch rainfall belt, just a little west of here.

The 14-inch rainfall belt starts off through Bennett County, through Pierre and on north a little east of Mobridge. The 12-inch rainfall belt is west of there. It starts off in Shannon County, goes up through Wall, S. Dak., and near Wall just up to Lemon, S. Dak.

Another 12-inch rainfall line encircles the Black Hills and as we get into the Black Hills we get up to 16 inches in the higher areas.

I do not imagine that underneath coloring shows through this very well but we thought you might be interested in the topography of South Dakota. Because of the surface conditions here, for instance, at Eagle Butte, which is located about here in that deep artesian aquifer formations, Eagle Butte just this past year or so went 5,000 feet for water. It is in a very difficult place to get for domestic or municipal water supply.

The CHAIRMAN. What was the result of that effort?

Mr. GRIMES. Pardon.

The CHAIRMAN. What was the result of that effort?

Mr. GRIMES. They had their water supplies. It is salty, and it is quite hot, 125° F.

Out in the western part of the country in this location we had a failure in an oil test well where they hit water at terriffic pressures and they lost the well. The result is we have a wild well out there which is blowing 3,000 agllons a minute of 130° water.

We have another place just north of Philip where a cattle company went 4,300 feet to get a stock water supply this year. We have in this area in the State perhaps 80,000 stock water farms of which perhaps 70,000 are located west of the river.

I understand from an ASC official that I was speaking to yesterday that 47,000 of their dams are dry this year, consequently operators have gone to great expense to develop these deep-water supplies in order to get the well water, salty or no. It is their only solution.

Senator CASE. I think Senator Kerr might be interested in knowing that this deep well at Eagle Butte was dug for the purpose of supplying the Cheyenne River Indian agent tribal headquarters which has been moved from the Cheyenne agency due to the inundation there from the Oahe Dam. So the Federal Government has not merely an interest but a direct dollar concern with the cost of developing a water supply for Eagle Butte where the new agency headquarters is located. That is where they went to 5,000 feet and got 125° water.

Mr. GRIMES. The reason that they have to go so much deeper in the western part of the State for these artesian supplies is simply because the artesian basin is level about 300 feet above sea level for

this upper one and as we go across South Dakota east to west we have quite a steep gradient on the surface.

Senator CASE. For the record, what is the relative elevation for the area around Sioux Falls, the Jim River Valley, Missouri Basin and then the western part of the State?

Mr. GRIMES. Well, here is Sioux Falls. Its elevation is in the neighborhood of 1,500. As we go across the divide into the Jim River Valley we get up to about 1,700 elevation. It rises 200 or 300 feet. Down in the Jim River Valley we get down to about 1,300. In the hills and also in this area we are above 2,000 feet. There is a valley through here which is a part of irrigation proposals into the Jim River Valley where the elevation through here is 1,700.

Senator CASE. Again, when you say "here" may I point out you are indicating an area between Miller and Selby.

Mr. GRIMES. Yes.

Senator CASE. Where the valley exists?

Mr. GRIMES. Yes. Where we get to the Missouri River up here at Pierre, say 1,500 and starting from the Missouri River bluffs when you get bluffs up to——

The CHAIRMAN. West of the river?

Mr. GRIMES. Yes, just west of the river, which is in the neighborhood of 2,000 feet and 2,400 about Philip. Rapid City is about 3,000 feet and the hills go up to 7,500 feet.

So with the level artesian aquifers the depth increases to that water supply as we go west.

This map [1] that I have here is a little different than most maps. In most maps we attempt to separate for clarity the various project proposals. What I have here put on one map is what we might say is a projection of multipurpose development in South Dakota. It concerns the flood control program of the co-ops, the watershed and other programs of the Soil Conservation Service and other Department of Agriculture agencies, the Bureau of Reclamation and the miscellaneous purposes that these projects serve in the way of recreation, fish, and wildlife, recharging ground water and so on.

We have, and there will be some particular references in my prepared statement to the Oahe unit, a proposal of the Bureau of Reclamation. Incidentally, I might say that the general area represents irrigation of a project type. Perhaps you can see these little red rectangles. They represent the water spreading type of development which our ranchers increasingly use now for stock feed basin.

The round dots which you see represent surface water development on an individual farm basis, while it may not be apparent. The crosses represent individual farm developing ground water supplies for irrigation purposes. In the development of ground water, especially here in the last 4 years, farmers on their own initiative and using their own resources developed about 60,000 acres of irrigation in eastern South Dakota.

Senator CASE. Was that 60,000?

Mr. GRIMES. Yes.

Senator CASE. In the eastern half of the State?

Mr. GRIMES. Yes. It is primary ground water. And the stream portion of it is in the eastern section of South Dakota in our heavy rainfall area.

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[1] Not printed.

On the map, the existing resources are in blue, and those which are proposed or to be enlarged are crosshatched in blue. We have shown by various diagonal insignia the flood control as it has been developed in South Dakota at the present time. By slanting lines we show those which are reaching a feasibility report stage or being readied for construction.

The other lines represent those areas where flood control is very badly needed in South Dakota, primarily the James, Vermillion, and Big Sioux Rivers.

Shown also on the map in solid markings are watershed developments already in place or under construction. In dashed lines are those that have been approved for planning assistance, and the dotted portion represents areas which very badly need that kind of flood prevention and protection of erosion of the soil which came about through that watershed prgram.

I might point out that here is an area, and there are other areas in South Dakota, where very, very close coordination among those three Federal agencies and State agencies and anyone else interested must be exercised. All the programs of the various Federal and jurisdictional agencies must culminate in one plan of multipurpose development.

Senator CASE. Where you say "here" you mean the Oahe unit, generally speaking?

Mr. GRIMES. The northern portion of the Oahe unit and Oahe unit proper.

Senator CASE. Which run north and east of Aberdeen to a point?

Mr. GRIMES. East of Redfield.

Senator CASE. East of Redfield.

Mr. GRIMES. The yellow here represents proposed irrigation developments and are the ones being planned now. This is on the most recent investigations that we have and for our entire western country, all these western tributaries with only two exceptions. The original irrigation proposals that were contained in Senate Document 191 in the Flood Control Act of 1944 have been, under present economic conditions, ruled infeasible. The same thing holds true for those western tributaries that are under control. Feasibility determinations as they are figured under Federal principles do not justify the development of those projects at the present time.

East of the river we have a better relationship. We will have references to the Lake Byron stage of the Oahe unit. Lake Byron is located here. It is about 17 miles north of Huron. And its first stage would be the development of the Jim River waters at this point, at the point of Lake Byron for irrigation of that small acreage of land, using Jim River waters only.

We will make reference to the Missouri slope area of the Oahe unit, which is this area here, just north and west of Utica, S. Dak. We will make references to South Dakota pumping units which are these yellow areas extending along the main stem of the Missouri River from Pierre to Yankton, S. Dak.

And we will make references to the Geddes-Wagner-Tyndall areas which represent this area in this location from about Geddes, S. Dak., down to just north and west a few miles of Yankton, S. Dak.

Senator CASE. Mr. Grimes, I don't know whether the committee has determined what will be possible on the reproduction of charts and maps, particularly where there are several colors involved, but I wonder if these charts will be available to the committee and may it keep them in its files for reference?

Mr. GRIMES. We may do that, or if you would like to have something that is more convenient for use these could be reduced and in place of the colors, various crosshatchings used to indicate this particular combination of developments.

Senator CASE. Yes. Would you furnish those for the minutes?

Mr. GRIMES I would be glad to.

Senator CASE. Thank you.

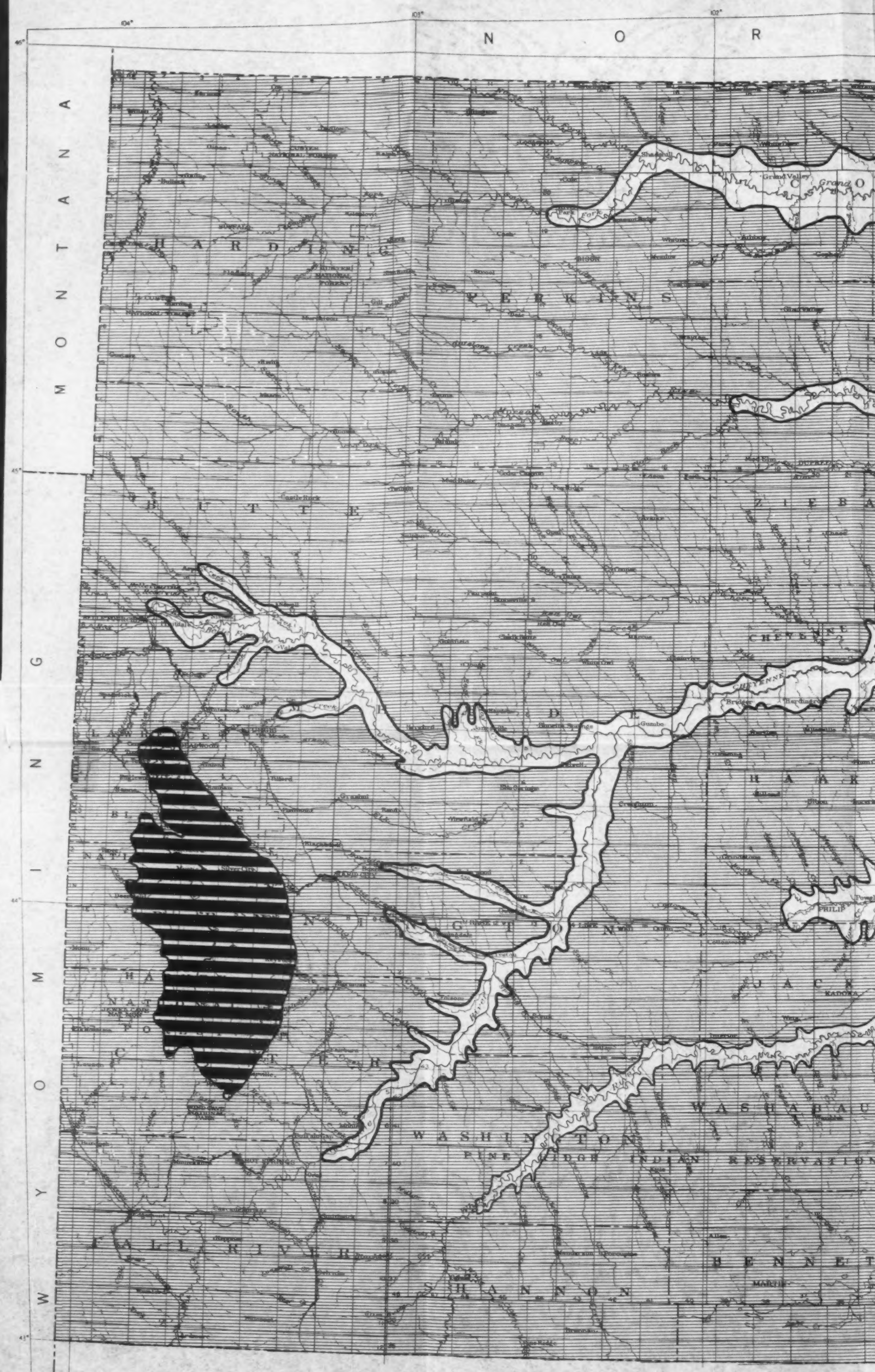
Mr. GRIMES. I hope that I haven't taken too much of the committee's time with this explanation but I did think that it was important to show what we have in South Dakota, what we have done with it and what we feel are necessary developments in the State which would be of interest to the committee.

I will read my prepared statement.

I am chief engineer and executive officer, South Dakota Water Resources Commission.

Agriculture is our principal industry in South Dakota. We anticipate that farming, stock production, and stockfeeding will be our dominant economic bases for many years to come. These agricultural enterprises are hazardous occupations due to scanty and very variable seasonal and annual precipitation. We anticipate that our marginal cash crop farming will change to stockfeed production operations to a greater and greater degree. Our stock producers and stockfeeders, more and more, will depend upon farmers for supplemental stock feed production.

This integration of farming-livestock operations has occurred in the extreme western area of South Dakota where irrigation has stabilized farm production to a considerable degree both as to quantity and price. Investigations have shown that combinations of good water and good land in economical water resources development relationships are very scanty throughout the western part of the State. Opportunities for additional irrigation development, therefore, are very limited. Individual ranch irrigation feed-base development is quite prevalent and within the limits of local water supplies and stockwater requirements, this trend will continue. Unless winter feed supplies become available in dependable quantities at reasonable prices, however, most stock producers must continue to depend upon natural production on their own land for summer grazing and winter feed. In South Dakota, this means reservation of about one-quarter of the stock producers grazing land for winter feed. This is sufficient during average precipitation years. During wetter years he stockpiles hay for the dryer years. During the drier years, the grazing period is short, and he depends upon his carryover feed to carry his herds. His greatest worry is extended dry periods which force him to either buy feed on a shortage market or dispose of part of his herds on a falling price market. He can weather such business reverses for a year or two, but he is in very serious circumstances when extended drought requires the decision to purchase feed for his breeding herd or sell some of this stock. Too often he faces these hazards.



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF SOUTH DAKOTA

A. F. Hassan, Cartographic Engineer
Compiled in 1920 and 1921

Scale 1:500,000

10 0 10 20 30 Miles
10 0 10 20 30 40 Kilometers

Modified polyconic projection
North American datum
Edition of 1921, reprinted 1944
National Forest names and boundaries not corrected to date

Additional
"Sundance Sand
the Minnelusa-
Also, wate
in the central
the Ordovician
to construct

48186 O-60-pt. 6 (Face p. 968) No. 1

"DAKOTA" ARTESIAN AQUIFER

areas of flow are in central South Dakota from the
and," and in the area just east of the Black Hills from
a-Pahasapa limestones.
ter from Mississippian and Ordovician limestones flows
al and western parts of the State, as does water from
an Winnipeg sandstones. Data are too sparse at present
accurate maps for these aquifers.

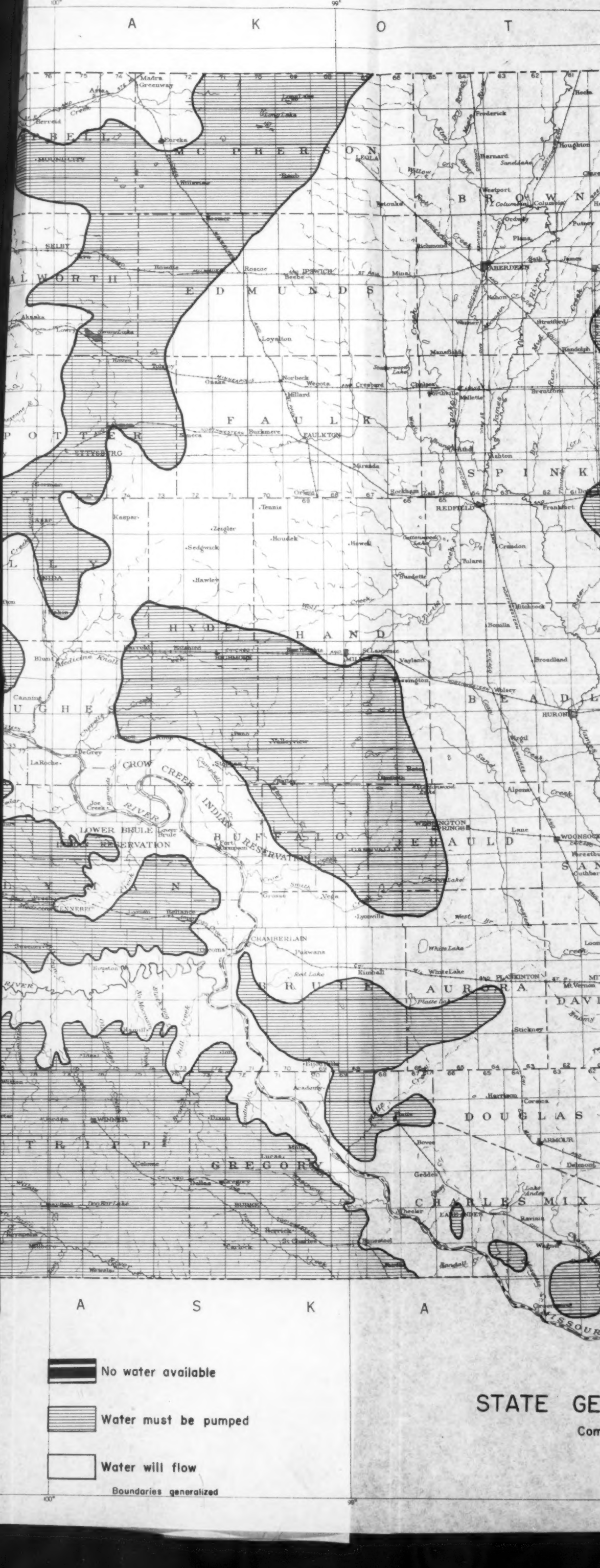
No water available

Water must be pumped

Water will flow

Boundaries generalized

N AQUIFER



A S K A

No water available

Water must be pumped

Water will flow

Boundaries generalized

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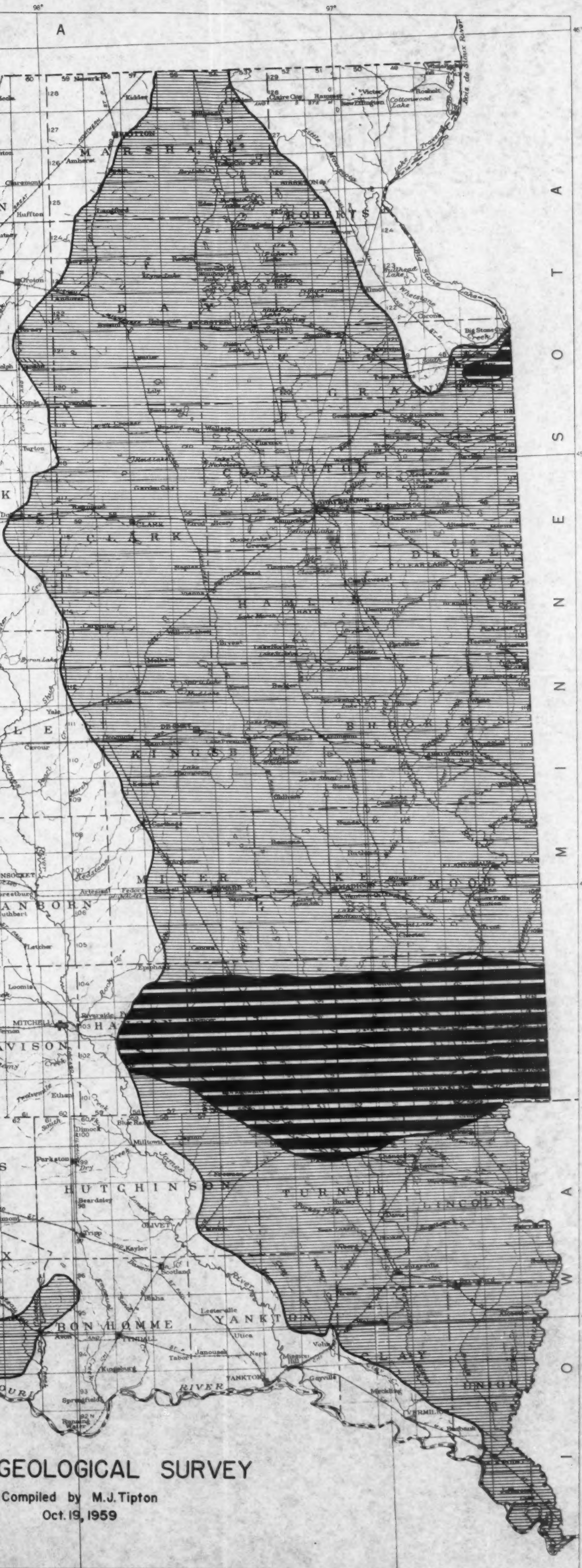
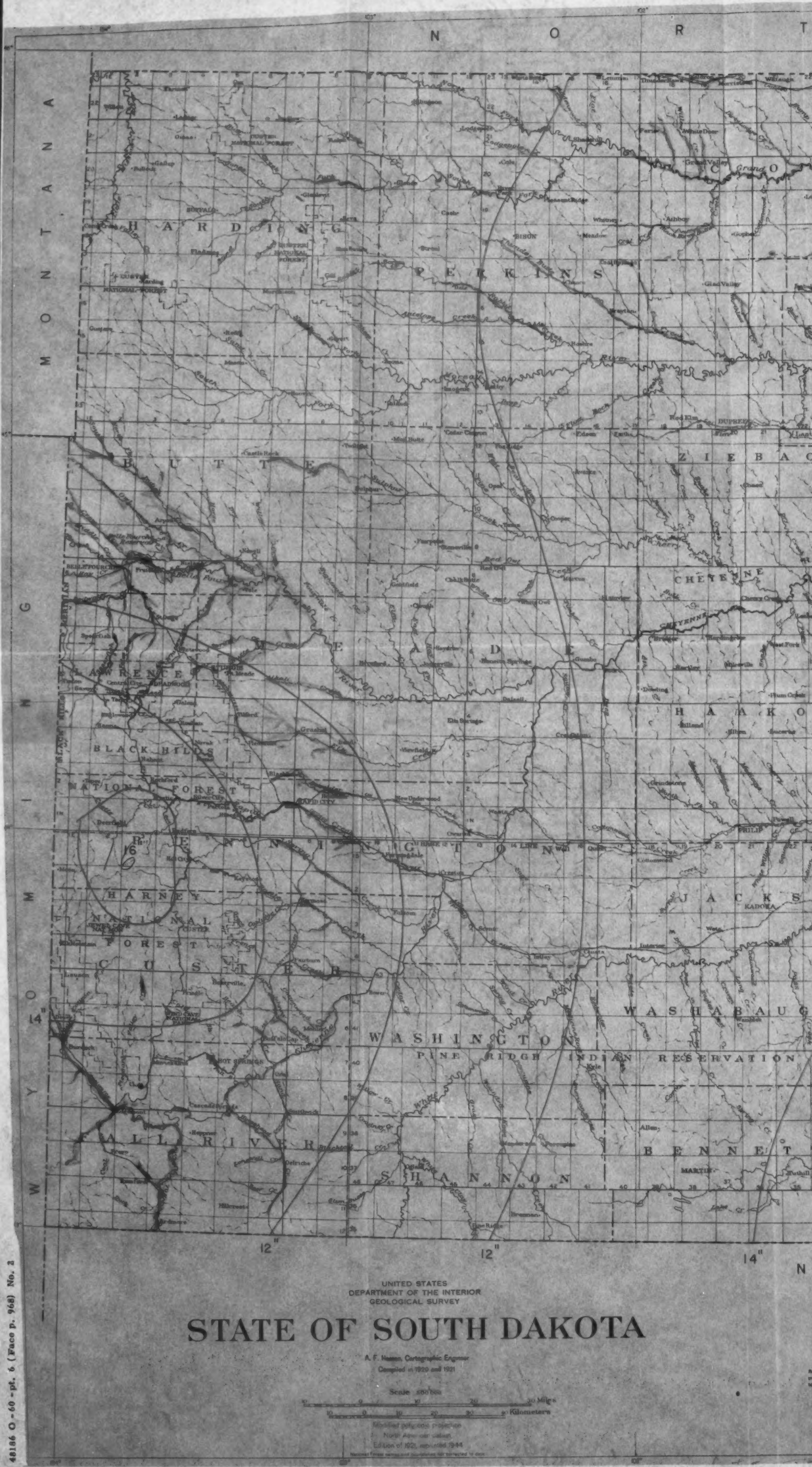
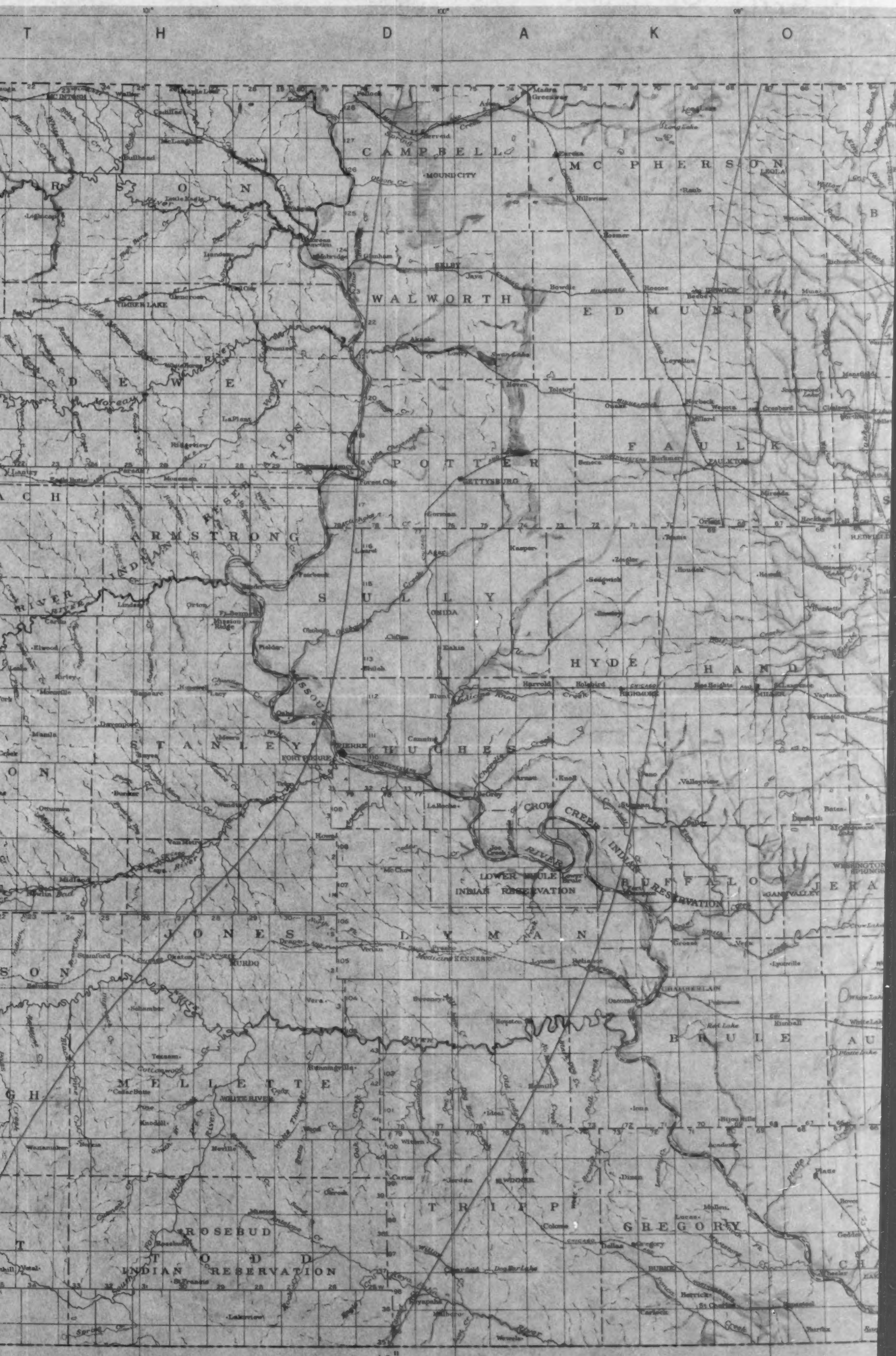


GEOLOGICAL SURVEY

Compiled by M.J. Tipton

Oct. 19, 1959


NORTH DAKOTA
MONTANA
WYOMING
HARDING
PERKINS
BUTTE
ZIEBACH
MEADE
CHEYENNE
HAAKON
JACKSON
MELLETTE
TODD
TRIPP
LAWRENCE
BLACK HILLS NATIONAL FOREST
HARNEY NATIONAL FOREST
CUSTER
FALL RIVER
SHANNON
WASHINGTON
PINE RIDGE INDIAN RESERVATION
BENNETT
MARTIN
Belle Fourche Reservoir
Angostura Reservoir
Cheyenne River
White River
Bad River
Grand River
Moreau River
Little Missouri River
Spearfish
Deadwood
Lead
Rapid City
Sturgis
Hot Springs
Buffalo Gap
Wind Cave National Park
Edgemont
Oelrichs
Pine Ridge
Kadoka
Interior
Wall
Quinn
Scenic
Philip
Faith
Isabel
Timber Lake
Dupree
Eagle Butte
Mobridge
Glad Valley
Lemmon
Shadehill
Whitlock
Ashley
Bison
Prairie City
Ralph
Ludlow
Meadow
Gorham
Whitney
Gallup
Buffalo
Glenrock
Flatiron
Grand River
Cave Hills
Slim Buttes
Castle Rock
Twilight
Mud Butte
Fox Ridge
Sulphur
Ardmore
Pringle
Custer
Fairburn
Buffalo Gap
Smithwick
Hermosa
Edgemont
Oelrichs
Hillsview
Provo
Red Owl
Cherry
Opal
Owanka
Allen
Martin
Ruthill
Bryant
Watauga
Grand Valley
Ashley
Gopher
Glad Valley
Edson
Zenda
Red Elm
Cedar Canyon
Fox Ridge
Mud Butte
Twilight
Castle Rock



SEPTEMBER 1959

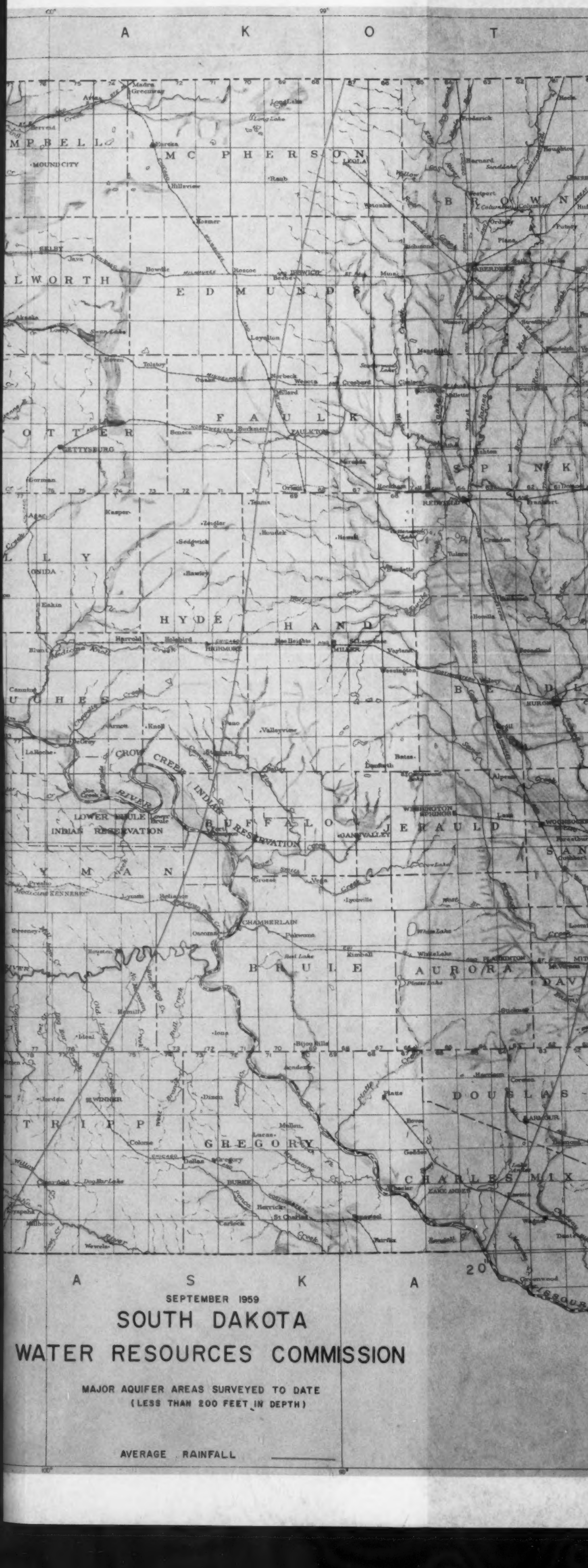
SOUTH DAKOTA
WATER RESOURCES COMMISSION

MAJOR AQUIFER AREAS SURVEYED TO DATE
(LESS THAN 200 FEET IN DEPTH)

AVERAGE RAINFALL _____

Relation of the State of South Dakota to areas of the rest of the World on the basis of 1:1,000,000

YANKTON — State capital; County seat name; City or large town; Town or village; Railroad


A K O T
A S K A
MCPHERSON
EDMUNDS
FALK
SPINK
BROWN
MARSHALL
DAY
FAULK
OTTER
HYDE
HAND
BEADLE
JERAULD
BUFFALO
BRULE
AURORA
DOUSLAS
TRIPP
GREGORY
CHARLES MIX
YANKTON
CAMPBELL
WALWORTH
SELBY
FAULKTON
GETTYSBURG
HIGHMORE
MILLER
REDFIELD
MURDO
WINNER
CHAMBERLAIN
KENNEBEC
LOWER BRULE INDIAN RESERVATION
CROW CREEK INDIAN RESERVATION
SEPTEMBER 1959
SOUTH DAKOTA
WATER RESOURCES COMMISSION
MAJOR AQUIFER AREAS SURVEYED TO DATE
(LESS THAN 200 FEET IN DEPTH)
AVERAGE RAINFALL

A
96°
97°
MARSHALL
ROBERTS
DAY
GRANT
CODINGTON
CLARK
DEUEL
HAMLIN
KINGSBURY
BROOKINGS
MINER
LAKE
MOODY
HANSON
MC. COOK
MINNEHAHA
HUTCHINSON
TURNER
LINCOLN
BON HOMME
YANKTON
CLAY
UNION
MINNESOTA
IOWA
24"
28"

The farmer-stock feeder faces the same hazards on a shorter cycle basis. He does not have reasonable assurance of his farm feed production versus the number of livestock to be fed.

The waste of productive capacity in these operations is a considerable proportion of the productive capacity used.

With the increasing flexibility of economic transportation of stock and feed, integration of irrigated and dry land operations is now possible over much larger areas. Our need for irrigation development in terms of our stock producing and stockfeeding industries is acute.

Integrated irrigated land: Dry land operation offers economic stability to our farmers alone. Under present conditions, he faces want or plenty nearly every year. Climatic conditions force him into small grain-corn rotations. He is not able to fertilize his land adequately because he has faced too often less production with fertilization than without. With fertilization his crop stand is too heavy to be supported by late season moisture. Neither he nor the stockman can contract for his farm production. Neither can depend upon production. Of recent years, the farmer has depended largely on federally sponsored market "support prices." Too many of our farmers have become "cash crop" farmers with 4 or 5 months gainful employment. Still more recently we have seen farmland go into "soil bank" or "conservation reserve" status. Yet, within South Dakota, stabilized stock feed from such areas is vitally needed.

Integrated irrigation: Dryland agriculture is a solution for many of our farmers, not only those on irrigated land but for their more and more distant neighbors.

Our urban services and industry are dependent, primarily, on agriculture. Their well-being fluctuates with agriculture.

Local water supplies for all uses are still available in many parts of South Dakota. During the past 4 years, individual farmers have developed about 60,000 acres of irrigation from these sources. However, the only source of adequate irrigation water supplies in the amount needed are those in the Missouri River. We can develop local water supplies. We need Federal investment assistance to transmit Missouri water to places of need and use. Construction and development of proposed Federal irrigation projects are solutions for stability of our farm, stock producer, and stock feeder industries and supporting urban services. Other serious water supply needs, domestic, municipal, industrial, recharge of ground water, pollution control, flood control and others, may be incorporated in such projects. Esthetic values in the form of greater economic security, recreation, fish, wildlife, would be forthcoming, also.

Between now and 1980 only a portion of the proposed and needed Federal irrigation projects with associated miscellaneous purposes can be built. On the basis of current investigation results, the following specific actions should be taken as quickly as possible:

(1) Provide construction funds for the first two stages of the Oahe irrigation unit; the Byron Reservoir stage to develop the full water resources of the James River at this location and the Missouri Slope stage to replace the stock feed bases lost to Missouri River mainstem reservoirs and to start the primary Oahe unit water supply system.

48186—60—pt. 6——2

(2) Provide construction funds for the South Dakota pumping units to replace stock feed-base areas lost to Missouri River main stem reservoirs and to get stable stock feeds available in areas needing them most.

(3) Provide construction funds for the Geddes-Wagner-Tyndall units to provide an initiation of the production of stock producer and stockfeeder feed supplies, to maintain existing natural water recreation areas and to test, if considered desirable, the integration of irrigated and dry land under South Dakota conditions.

(4) Maintain the program of Federal-local construction of stock water supplies in areas where irrigation water supplies, probably, are not feasible. Controls are needed to offset the somewhat indiscriminate construction of stockwater reservoirs under South Dakota conditions.

(5) Provide water resources investigation funds and provide funds for practical applied research concerning possibilities and problems of integrating irrigated and dry-land agricultural production.

There are considerable areas in South Dakota needing flood damage relief. The most acute areas are control for the James, Vermillion, and Big Sioux Rivers in the eastern part of the State. Construction of flood control projects along the main stem of these streams should be undertaken as soon as possible. Tributary flood prevention projects should be constructed rapidly including soil erosion facilities and conservation storage capacities in all worthwhile instances.

Construction of the irrigation projects will be in areas where return flows and supplemental water deliveries will solve many other water supply problems, providing they are planned for such multiple purposes.

These are our acute water supply problems. We can do much for ourselves but we need Federal capital to spread our Missouri River waters to places of use.

I thank you very much.

Senator CASE. Any questions?

The CHAIRMAN. No.

Senator CASE. Senator Hart?

Senator HART. No.

Senator CASE. Thank you very much, Mr. Grimes. The statement is appreciated and the charts will be useful for references of the committee.

Our next scheduled witness is mayor of the city of Huron, Mr. R. B. Matson.

In presenting Mr. Matson I should like to say that personally I think it is highly appropriate that we should have this hearing in the city of Huron and that the mayor should present his matter at this time for the city of Huron has been outstanding in its interest in the water development throughout the State. The officers of the Bureau of Reclamation, the soil conservation people, the Agricultural Conservation and Stabilization Offices are here. Huron is the very heart of our agriculture and acquainted with the water problems of the State and Huron itself has its own water problems which the mayor will now present.

STATEMENT OF MAYOR R. B. MATSON, CITY OF HURON, S. DAK.

Mr. MATSON. Mr. Chairman, Senator Kerr, Senator Hart, and Senator Case, it is the best thing for me to do, I think, perhaps, to extend to you a cordial welcome to our city, that being the usual case of the mayor's presentations. I am very happy that you are here, that you have chosen our town to let us present our problems and we sincerely hope that everyone will treat you as you should be treated and not get too critical of some things that they might have in their minds.

Some 2 weeks ago we had one of the Cabinet members here, Mr. Seaton, and we were able to present to him approximately the same presentation that we are going to make to you today, in regard to our immediate problems in this vicinity. So I am going to read my article, so that you will have exactly the words in your possession that I speak today. This will be the testimony of R. B. Matson, the mayor of the city of Huron.

In presenting our problem, it should be first understood that what we are in favor of is somewhat different from the approach most cities in this north-central area will be making.

Now that the Missouri River project dams are reaching final stages of construction and the Fort Peck, Garrison, Gavins Point, and Fort Randall Dams are completed, Oahe nearly completed and Big Bend scheduled for flood control, irrigation, power, and navigation plus recreation and other purposes, irrigation is next and vast studies have been made and feasibility reports are forthcoming or already in your hands.

We are of the opinion that in order to complete the irrigation features, further study and reports will be necessary and it is not my intention to dwell on that subject as it will be introduced by others in attendance.

We understand that an enlarged Lake Byron, 17 miles north of Huron, will be an important irrigation and flood control storage reservoir for the Oahe irrigation project. We would like to have municipal water supplies included in this reservoir for the city of Huron and would like to have this part of the irrigation project built first. We understand that this could be done using James River water which would be supplemented by Missouri River water later.

Use of Lake Byron as a flood control lake, an irrigation reservoir, and a municipal water supply basin as a future water supply for the city of Huron will and should occupy most of my time and effort.

The Corps of Engineers have spent some time studying the Lake Byron Basin as a possible flood control storage site. The Bureau of Reclamation has surveyed the area and already knows a great deal relative to costs involved and are, we believe, in a position to furnish a report on the Lake Byron part of the Oahe irrigation project as a first construction stage. This report would cost very little and could be done rather quickly.

If this large supply of water is developed at Lake Byron, it should also be considered as a necessary water supply for the city of Huron and arrangements made for the city to use this water in whatever amounts necessary for municipal use as has been previously proposed. We further believe that about 10,000 acres of land could be irrigated

profitably from this reservoir using James River water, if we store the spring runoffs and floodwaters.

When Huron was founded and until 15 years or so ago, the river has always been a sufficient supply of water for the needs of the city except during the "dirty thirties." However, farmers have dammed up small tributary streams all along the James River and across the river from Huron to the headwaters of the James River, a Federal dam has been built at Jamestown, N. Dak., that has entirely shut off the natural flow of the James River. Sand Lake, which is a Federal waterfowl refuge, has also shut off the river's flow; and the city's need for water has increased threefold. The result of these happenings has developed into an impossible water supply situation for the city of Huron.

The James River flows have not been large in the past few years; the 1959 river flow has been the lowest we have ever experienced. A chart showing the flows of the James River from 1929 to 1959 is attached. Due to this condition, the city of Huron has spent rather large sums of money trying to locate favorable water supplies from the ground water aquifer which is known to be present at various places in our area. The only results we have obtained up to the present time is one small well 4 miles west of town now furnishing about 500,000 gallons daily and another well northeast of town furnishing about 700,000 gallons daily. We drilled another well about one-half mile from the northeast well and struck a dry hole in the bottom of which were old petrified fossil bones and large quantities of rocks, denoting a condition of possible unusable water. The water we are now getting from the existing wells contains about 5 parts per million of iron and about 100 parts per million hardness. To continue to give the people of Huron safe usable water, processing this quality of water will be quite expensive.

Our city population has increased over 50 percent during these past 20 years. We have just completed an expenditure of $750,000 to enlarge city mains, increase distribution, storage capacity, and extend the supply lines all around the city. This system is designed for a city of 25,000 people. Our problem now is an adequate water supply. We are willing to pay a reasonable amount for procuring this additional water supply, but we do not feel that we are wholly responsible for our lack of supply. Improvements to and for others have been allowed to proceed without any consideration to the only city in South Dakota which has for years depended upon the James River for its municipal water supply.

Our past and estimated future water requirements to 1980 are shown in the following tabulation:

Year	Population	Water use (gallons per year)
1940	10,843	180,000,000
1950	12,788	260,000,000
1960	16,000	684,000,000
1980	25,000	1,550,000,000

Honored gentlemen, we deem it an honor and a privilege to appear before you. We make this appearance very humbly, without both hands out for gratis assistance, knowing full well that municipal

water supplies are a problem in many communities and will increase as time goes on. However, we propose a solution, a project that will be an integral part of the Oahe irrigation project and we justify our request that the Lake Byron project can be constructed as the first part of the irrigation and flood control project for the immediate health and welfare of this thriving community and for those who will live here as the community continues to grow.

Senator CASE. Mr. Mayor, we want to thank you for that statement and we want to say to you and the people of Huron who may be present here, that with his customary modesty, the chairman, Senator Kerr, may not say this but I will say he has been a leader in a movement to secure the adoption of legislation nationally that would include municipal water supplies as one of the purposes to be served in the construction of multiple-purpose projects. In the last omnibus Rivers and Harbors and Flood Control Act it was on his suggestion that we added title III, which is a title over and beyond the customary rivers and harbors and flood control projects. It wrote into the Federal law a provision for planning capacity and design necessary to include municipal water supplies. That title III, entitled "The Water Supply Act of 1958," I think, is applicable in our water legislation and the credit for it should largely go to Senator Kerr.

Without attempting to commit him as to your individual project, I can say it is most appropriate that you should present your project here to this committee in his presence.

Mr. MATSON. Thank you.

Senator CASE. There has been some difference of opinion as to how far the Federal Government should go in financing municipal water projects as such, that is, filtration plants or pumping stations or things of that sort. But it has been the conviction of the Senate Committee on Public Works, on which Senator Kerr and I serve, that in designing projects that lend themselves to the incorporation of municipal water supply features, that that should be done. Otherwise we would be wasting valuable water resources. We also feel that where possible we should incorporate the municipal supply features in the design of structures and to make it possible to do that even though an immediate need is not present. The provisions of title III make it possible to defer the construction and reimbursement of the construction cost assignable to the municipal water supply until such time as the supply is used and needed rather than go back and have to tear something out. This provision makes it possible both in dams constructed by the Corps of Engineers and by the Bureau of Reclamation to include municipal water supply features.

Mr. MATSON. Senator Case, I don't want to be misunderstood on this statement. I didn't elaborate too much on what we stand for. We are not entirely asking for municipal water supply. We do feel that Lake Byron will be an integral part of the Oahe project if and when it goes through. There will have to be some place to store floodwater coming out of excess water in the dam. We propose to use that water. We propose to use that water to irrigate submarginal land that is now not considered the very best land in South Dakota to irrigate. We are aware of the fact that this land we are proposing for irrigation out of this first State project would be land that would produce perhaps to a greater extent than either the Angostura or Bell Fourche projects.

We are convinced in our minds that it could work. It would be an expenditure of a rather small amount of money, the dam being put in based upon what we wanted to do from a standpoint of irrigation, whether it raise Lake Byron 8 feet or 20 feet, but put it in so it could be enlarged if it need be. I did not go into that elaborately in my presentation. I did strike on it so you will know it is there. The reason I am bringing it up now is because I want you to know that this is not just an attempt from the standpoint of Huron to get a water supply. We are still hopeful that with the wells that we have and run down river that we wouldn't need too great an amount of water to substantiate the dam.

In past years we have had to control our water use in the city during those hotter months of July and August. It is rather difficult now with air conditioners and new homes being built, new lawns being put in, to find some sort of a, let's say regulation, that meets with the approval of all the people. So we do need a further water supply than we have but that is not our primary request.

Senator CASE. But you want consideration of municipal water brought into the picture when the irrigation and flood control project is developed?

Mr. MATSON. That is right.

Senator CASE. And you do urge that that be a first stage operation?

Mr. MATSON. Yes, a first stage operation.

Senator CASE. One of the first units to be developed?

Mr. MATSON. Yes.

Senator CASE. Are there any questions?

The CHAIRMAN. I have an observation, Senator Case, if I may.

Senator CASE. Go ahead.

The CHAIRMAN. Mr. Mayor, the presentation of your situation here is illustrative of what is going on throughout the entire length and breadth of this Nation. Senator Case and I sponsored the legislation that he referred to, secured its adoption by the committee and the Congress, recognizing the necessity for municipalities to have increasing supplies of water in the future, or being forced to eliminate the possibilities of increasing their population or maintaining their present population.

I thought you gave us a very good presentation. One of the most significant things about it is you have outlined the necessity or the need for water for the next 20 years, and I think that they are modestly stated. I think it would be a mistake for the Nation and for Huron to have a policy that would provide the means for the normal growth for the next two decades but which when provided would become a shackle that would not permit either maintenance of that growth thus achieved or the future increase.

So I think that you would be justified in vigorously urging the project you are talking about with the allocation of as much of it as is possible for present and future municipal water requirements, and I would say this to you, that it would be the kind of a project which I think will occur more and more frequently as we go forward.

As far as I am concerned, with my services on the Public Works Committee, of which I am next to the ranking Democrat and chairman

of the Flood Control Subcommittee, and on which your Senator is the ranking Republican member, it is the kind of project which will be regarded as being as worthy as any and much more important than some that will be presented to the committee. It is not our fault, neither yours nor mine, nor that of Members of the Senate, that this country of ours is moving gradually but inexorably from a situation where large percentages of its population live on the farm to one where more and more of our population live in urban communities and that trend is dependent upon making provision for acquired water supplies for those urban communities. I am not even responsible for the stepped-up rate for personal bathing, nor do I participate in it to the degree of many, but it is a situation that exists and I have found out in my years that the people's needs will be served on the basis that they determine them rather than on the basis that others might determine them for them.

Mr. MATSON. That is right.

If there are no further questions, Mr. Chairman, I would like at this time to have your minutes of this hearing show that the South Dakota Municipal League, representing over 300 cities and smaller towns in South Dakota, has appeared before you and that I, R. B. Matson, being an executive officer of the league, make a statement at this time that the league is for the Oahe irrigation project and urge favorable legislation as soon as possible.

Senator CASE. Thank you very much, Mr. Matson.

Mr. MATSON. Thank you.

Senator CASE. The next witness, Mr. Jim Ruddy, will represent the water resource committee of the Huron Chamber of Commerce, and I understand also the South Dakota State Reclamation Association.

Mr. Ruddy.

STATEMENT OF JAMES H. RUDDY, REPRESENTING THE WATER RESOURCE COMMITTEE OF THE HURON CHAMBER OF COMMERCE AND THE SOUTH DAKOTA STATE RECLAMATION ASSOCIATION

Mr. RUDDY. Mr. Chairman and members of the committee, for the record, my name is James H. Ruddy of Huron, S. Dak.

I represent the water resources committee of the Huron Chamber of Commerce and also the State of South Dakota Reclamation Association.

I have two written statements, one from each organization, which I filed with this committee and I request permission to read the one from the Huron Chamber of Commerce.

Senator CASE. You may do that. And do you want the statement for the South Dakota Reclamation Association inserted in the record?

Mr. RUDDY. I would appreciate it very much.

Senator CASE. That will be done.

Mr. RUDDY. Thank you, Senator.

I consider it a privilege to testify before this committee and we are honored that you chose our city as a place for one of the two hearings which you are holding in South Dakota. I trust that the very fact that you are meeting here is an indication that you do recognize that South Dakota has water problems and they can be corrected. We are fortunate that our own Senator Case is a member of this committee,

as he as well as any of us testifying is well aware that the water situation in South Dakota has historically been one of too much or too little.

Because of this water problem in South Dakota, the overwhelming majority of the people were most happy and encouraged when the Flood Control Act of 1944 along with the O'Mahoney-Milliken amendment was passed by Congress.

The people of South Dakota were well aware that complete development of the Pick-Sloan plan in the Missouri River Basin was the only way that we could bring water to eastern South Dakota and in so doing provide the following benefits.

1. South Dakota is losing farms at the rate of approximately 1,000 per year. This trend would be reversed by irrigating smaller farm units.

2. Stabilization of farm income through irrigation which would provide assured feed supplies for our livestock.

3. Stabilized urban prosperity as a result of stabilized farm purchasing power.

4. Increased industrial production because of assured water supplies.

5. Increased number of agricultural processing plants because of stabilized production of raw material.

6. This increased business activity would provide new job opportunities for our young people who are forced to leave the State for employment after they are educated.

7. An increased capital investment in both rural and urban areas which would help solve our local tax problems through a broadened tax base.

8. A stabilized water supply for many municipalities which would permit their growth to continue.

9. Pollution control in many of our streams and rivers, particularly the James River in eastern South Dakota.

10. Flood control on the James River in eastern South Dakota.

11. Increase the level of some lakes and provide additional recreation, fish, and wildlife benefits to the people in the area.

12. To sum up the benefits; we know that areas which are short of water or which have not had the foresight to foster the construction of flood control, water supply, and other water resource projects, will be hard put to keep pace with the future expansion of the Nation's economy. These areas will be the depressed areas of the future. Quoting from a letter written by E. F. Garrett of Loveland, Colo., to the U.S. Chamber of Commerce in October 1957, further sums up what ample supplies of water could do for our State of South Dakota.

> I am writing as a small business man who has witnessed the magic of supplemental water in an irrigated section. I have seen new industries and payrolls result, and increasing carloads of eastern-built merchandise shipped in to supply the increased purchasing power. I have sen defense industries established in the area as a result of the hydroelectric power, and increased labor supply that can now be supported in the area because of the Bureau of Reclamation. I doubt if any Federal expenditure benefits every citizen of our Nation more than the Bureau of Reclamation in the creation of new wealth, commerce, and national security. The day may not be far away when Eastern States may need their services as we still need them in the West.

We have always realized the early adverse results of main stem developments on the Missouri River to South Dakota in the forms of

flooding of large areas along the river, disruption of many stockmen's operations who used these timbered and meadowlands as winter range, the relocation of farmers, removing property from local and State tax rolls and other effects. We have also realized that principal early benefits would accrue first to people and areas far downstream who would have most of their good from the Missouri Basin development long before the principal benefits would come to our area.

However, the people in this area supported vigorously the entire project as they were told their benefits would come at a later date. The O'Mahoney-Milliken amendment of 1944 established clearly the statutory right of States wholly or partly west of the 100th meridian to use upstream water for beneficial consumptive purposes.

There has never been any question that irrigation is one of the beneficial consumptive uses. This amendment served as a condition on which the entire authorization for the Missouri River program was made. It was in effect, a grant on the part of upstream States that they would permit floodwaters from Government dams to be parked in reservoir sites upstream—provided the water was used for beneficial consumptive uses. We should get the benefits we were guaranteed.

The Huron area has always been in the front ranks in the promotion of the Oahe unit and I can say with confidence that we will never change, as we well realize that only through the development of the entire Oahe unit can South Dakota receive its maximum benefits. However, we do realize that the Oahe unit as planned by the Bureau of Reclamation is a huge project and will probably have to be developed in stage construction. We in Huron are proposing the development of the Lake Byron Reservoir on the James River as the first stage construction of the Oahe unit. We realize this construction depends on the outcome of the Bureau of Reclamation's feasibility report which report is to be completed in July of 1960.

We in the Huron area would like to point out that the Lake Byron Reservoir is not a pork-barrel project that was dreamed up by the Huron Chamber of Commerce. The Lake Byron Reservoir is included in the Bureau of Reclamation's 1957 interim information report and we obtained information from this report that leads us to believe that construction of this project should logically be stage 1 in the Oahe unit.

We are submitting the following information in support of our conclusions:

1. The Lake Byron Reservoir site is the only feasible reservoir site of any size on the entire James River from Jamestown Dam in North Dakota to the mouth of the river near Yankton, S. Dak.

2. The Lake Byron Reservoir is an integral part of the entire Oahe unit.

(*a*) Of the total 554,000 irrigable acres in the Oahe unit, 282,000 acres are in the east Lake Plain area east of the James River. This entire east Lake Plain area must be irrigated through the facilities of the Lake Byron Reservoir.

(*b*) The Lake Byron Reservoir is planned to be used as a regulating reservoir for flows of water from the Oahe Dam and is also planned as a storage reservoir for flows in the James River.

(*c*) The Lake Byron Reservoir will provide a flexibility of operation intended to conserve water, save operating costs, and

provide flood control. Spring floodflows in the James River can be pumped into Lake Byron Reservoir.

3. Since Lake Byron Reservoir is an integral part of the Oahe unit any money spent on its construction, could and should be partially charged against the benefits to be derived from the entire unit.

4. Construction of Lake Byron Reservoir will in no way interfere with the overall Oahe unit development nor will there be any waste or duplication.

5. Construction of Lake Byron Reservoir as first-stage construction of the Oahe unit will provide the following benefits for the people of South Dakota before the water from the Oahe Dam is delivered into eastern South Dakota.

(*a*) The Byron Reservoir will provide for 57,000 acre-feet of useful water storage. The James River has a 27-year average annual flow of 124,182 acre-feet of water, with a variance from 10,000 acre-feet to 528,000 acre-feet per year. Storage and stabilization of only these wasted natural flows in the James River would mean a great deal to the people in this area in the way of a large available water supply. This storage and stabilization of the James River flows would be of benefit to the entire Missouri Basin.

(*b*) The stored waters in the Byron Reservoir could be replenished from the natural flows of the James River and be used to provide an assured supply of water for the city of Huron, additional water for relieving the downstream pollution problems and shortage of irrigation water. This year all irrigators on most of the James River were prohibited from using water for irrigation because of abnormally low water supplies in the river This stop order was given after the crops were planted and resulted in a great financial loss to many water users.

(*c*) In addition to the downstream benefits from a stabilized river flow the reservoir would provide enough water from the natural James River flows to start irrigating a small portion, possibly 5,000 acres of the east Lake Plains area of the Oahe unit. In the near future, when the Garrison diversion unit in North Dakota is completed, additional amounts of water will be released into the James River through the Jamestown storage dam. When this is done another portion of the east Lake Plains area could be irrigated without having to change the existing facilities of the Byron Reservoir. When our own Oahe Dam is completed along with the diversion canal to eastern South Dakota the balance of the irrigation water needed to develop the entire east Lake Plains area will be available and will be handled through the existing facilities of Lake Byron Reservoir.

(*d*) The proposed Byron Reservoir dam will be about 30 feet high and raise the present lake about 20 feet which will increase the size of the lake from about 2,000 acres to 4,400 acres. In addition to the irrigation, flood control, municipal water supplies, and pollution control benefits, the Byron Reservoir would return many benefits through providing a much improved fish and wildlife and recreation area for this part of South Dakota.

The 1956 Bureau of Reclamation estimated cost of the Lake Byron Reservoir project is shown below:

Byron Dam and Reservoir	$2,500,000
James River pumping plant	3,680,000
Canal (3 miles)	500,000
James River diversion dam	390,000
Total	7,070,000

I am sure that everyone will agree that the benefits will far outweigh the cost and we sincerely request that you give our proposal your sincere consideration.

In conclusion I wish to thank this committee for the opportunity to present our case. I can think of no congressional committee that is studying a domestic problem that even approaches the importance of national water resources. No natural resource is more important to our future than water. How we conserve it, harness it, utilize it, and safeguard it has a direct bearing on how this area and this Nation grows and prospers. The large majority of the people in our State fully agree with the statement made by the chairman of the committee, Senator Kerr from Oklahoma before a joint session of the South Dakota Legislature in 1959:

> We are convinced water will be worth more to us in the next century than our gas and oil.

South Dakota has given much toward water conservation for our Nation and we only ask that ways and means be made available for us to utilize our fair share of the Nation's greatest natural resource, water. Thank you sincerely.

Senator CASE. Mr. Ruddy, that is a remarkably clear and succinct statement. I hope that Chairman Kerr will note that his words of wisdom spoken when he was here some months ago at a hearing on a related problem were duly taken down and have been remembered.

The CHAIRMAN. I want to say that I noted it with great interest and appreciation.

Mr. RUDDY. Thank you.

Senator CASE. Are there any questions of the witness?

If not, thank you very much, Mr. Ruddy.

Mr. RUDDY. Thank you.

Senator CASE. I just want to say in passing that I think this is the most concrete, practical step for early utilization of the Missouri River Basin program for central South Dakota that has been advanced. I will certainly assure you of my personal efforts to see what can be done for its accomplishment.

Mr. RUDDY. Thank you, Senator.

The CHAIRMAN. I would only say to this witness and all others interested in this project that I not only would urge it on the specification you presented, but I would seek to find a way to maybe get it authorized on the basis of even greater specifications. My own observation about this and just about every water project for municipal and industrial use that I have seen is that if the recommended project were authorized and constructed, it would, of course, be most beneficial but very likely it would be inadequate by the time it was completed.

Mr. RUDDY. Thank you, sir.

(The statement of the South Dakota Reclamation Association follows:)

STATEMENT OF SOUTH DAKOTA RECLAMATION ASSOCIATION

RAPID CITY, S. DAK., *October 27, 1959.*

My name is Jim Ruddy, I am a resident of Huron, S. Dak. I am here in behalf of our secretary, Raymond F. Lund, who was unable to attend this hearing. This is a presentation of the South Dakota Reclamation Association, of which association I have been a member and director for several years.

The South Dakota Reclamation Association whose views are presented here, was formed in 1938, toward the end of the disastrous drought years of the thirties. Its membership comprises individuals in all lines of endeavor, voluntarily associated for the betterment of South Dakota. Ranchers, farmers, businessmen, civic and commercial organizations, and municipalities contribute to its support. Its major purpose is to aid and promote the conservation and utilization of land and water resources of South Dakota.

We in South Dakota occupy a unique position in the upper Great Plains area as our State is in the approximate geographic center of North America. By virtue of location we have experienced variations in the amount and distribution of rainfall as shown during the past 80 or more years of settlement; farming and ranching which has required reserves of water, feed, and finances. Climatic variabilities in this State have led to peaks and valleys in the curve of production. Most of the valleys in the curve of production are caused by drought. Low yields, crop abandonment, and frequent devastating destruction by insect hordes have been part of the story.

As a result of the general periodical failure of crop production, we have witnessed migration from the farms to villages and cities within the State. It coincides with that which has occurred in other areas of the Missouri River Basin. An examination of longtime weather records within the State reveals the inevitableness of recurring droughts. Unless steps be taken to conserve water, for maximum utilization, the evidence of past years point to the following trends:

(1) Farm units will continue to increase in size.

(2) The total farm population will decrease.

(3) Rural towns and villages which have provided high school facilities and a trading center for the servicing of rural areas will continue to decline.

(4) We may look for further migration out of the rural area toward crowded labor centers.

RAINFALL

The rainfall varies from 14 inches in the northwest corner of the State to 26 inches or more in the southeast corner. In one of the years during the thirties the rainfall recorded at the Rapid City station during a 12-month period was less than 7 inches of moisture. This extreme variation in rainfall within the State has resulted in correspondingly extreme variation in agricultural production. That in turn, contributed directly toward reoccurrences of depressed agricultural economy during many years of our history.

During the current year, 1959, there were many areas of the State that experienced an acute water shortage. Ironically enough, although rainfall charts for the current year would indicate perhaps, normal precipitation for most sections of the State, we experienced crop failures in many areas comparable to that experienced during the drought of the early thirties. The timing of the precipitation is a very important determining factor making for the difference between a bountiful harvest or no crop at all. Through the application of water to land at a critical period during the growing season, a crop may be assured where failure is otherwise experienced. In view of the record of the past, we may assume that the State will continue to experience reoccurring cycles of drought and years of ample rainfall.

STABILITY NEEDED IN AGRICULTURAL PRODUCTION

There is extreme need for stability in our crop production, for upon this the general welfare of the people is dependent. South Dakota is basically an agricultural State. If production could be stabilized it would assure a level of prosperity which would round off the peaks and the lows in the economic welfare of our people. In the 6-year period from 1954 to 1959, the total precipitation in the State was less than in a similar 6-year period during the thirties. This would indicate that we have been going through another drought cycle, reaching a climax (we hope) during the current year, 1959. Many of our towns and cities have experienced difficulty in finding an adequate supply of water. Many

farmers and ranchers have had to haul water, and in some instances for a considerable distance, in order to supply their domestic needs.

APPROACHING THE PROBLEM THROUGH IRRIGATION

The Bureau of Reclamation has been carrying on studies within the State for the purpose of developing information concerning irrigation possibilities. For instance in the James River Basin it is now estimated that there are about one-half million acres of land which will be feasible for irrigation development. This must come through stages of a gradual development which will require years for completion. Early stages of development should include a regulatory reservoir near Blunt. The overall development will require the construction of a canal to carry water from the Oahe Reservoir eastward to serve the different areas that may benefit from irrigation. A number of towns and cities in the area to be served by such a canal may profitably obtain supplemental water to augment their present meager supply. We can foresee the need for several million acre-feet of water to supply the demand from urban communities and from rural areas for irrigation purposes.

WATER DEVELOPMENT HAS BEEN GRADUAL IN SOUTH DAKOTA

From the first settler to the modern day South Dakota farmer, water has been the dominant problem. In early homestead days in the western part of the State, water was diverted from a few small streams in the Black Hills region to irrigate some of the adjacent lands. Following the passage of the Reclamation Act in 1902, additional lands were brought under irrigation as for example on the Belle Fourche project, some 56,000 acres benefited. During the early forties another 12,000 acres were developed in what is known as the Angosutra project, near Hot Springs. It is estimated that approximately 100,000 acres of land were brought under irrigation during the first half of this century.

During the past decade nearly 50,000 acres have been developed by farmers pumping from wells on their respective farms. For the most part this development has been in the eastern part of the State. However, studies and tests have thus far shown that the supply of ground water may be rather limited. Hence, we believe there is all the more need for diversion of water now stored in large reservoirs within the State, to areas of erratic rainfall and limited water supply. The needs of water for irrigation were recognized as of paramount importance by the Millikan-O'Mahoney amendment to the Flood Control Act of 1944.

With many towns and cities on a very restricted water schedule during the past summer months, it further points up the need for conserving and developing additional sources of water for the good of all.

IRRIGATION PAYS OFF

One nearby project where results have been carefully documented is the North Platte in Wyoming and Nebraska where water is supplied to some 350,000 acres of arid land. These are some of the facts included in testimony before congressional committees 3 years ago.

Federal tax revenues derived directly from this project amount to $16 million or almost three-fourths of the total construction cost.

The project has produced cash crops 20 times its cost.

During the drought and depression of the thirties, this irrigated area absorbed much of the population, shifting from distresed areas.

The irrigated area supports 27 times as many people, and provides 40 times the income as that of adjacent dryland farms.

This dryland area lost 12 percent in population through 1930 to 1940. The irrigated area gained 18 percent—a 30-percent differential.

Enough beans are produced here each year to meet needs of 14 million people—the combined population of New York City, Chicago, and Philadelphia.

Fertilizer plants, alfalfa processing mills, sugar beet plants, and meatpacking industry has followed annual marketing of a half-million head of livestock, made possible through processing of feeds.

In a single typical year more than 13,000 carloads of agricultural products were shipped to 32 different States.

Population in Scotts Bluff County soared from 2,552 in 1900 to 33,917 in 1940—after irrigation development. In the adjoining dryland Banner County by contrast the total population declined from 1,444 to 1,403 in the same period.

POPULATION INCREASES EMPHASIZE NEED FOR MORE PRODUCTION

Dr. Bryon T. Shaw, head of the U.S. agricultural research work, in addressing farm leaders, scientists, and industrialists attending a meeting of National Farm Chemergic Councils in St. Louis pointed out that the Nation is growing at the rate of about 2½ million persons per year. Actually it is estimated that there are about 3½ million babies born now each year, but with deaths the net population increase is reduced to around 2½ million persons. If by 1975 we have a population of 220 million people in the United States, it may necessitate the production of about one-third more food than was produced in 1950 to maintain living standards which we now enjoy.

Despite present crop surpluses it is estimated that by 1975 more than 20 million acres of farmland will be out of agricultural production, whereas our population will have increased by nearly 60 million.

WATER RIGHTS UNDER STATE LAWS

We of the South Dakota Reclamation Association favor legislation which would require Federal agencies, first, to comply with State laws relating to the use of water; second, to respect private rights to the use of water established by State authority. We believe that the right to use water is a property right which should not be taken from any person without due process of law and adequate compensation. We believe that any discussions relating to the further development of our water supply should likewise preserve the integrity of State law governing water rights.

Historically speaking the responsibility for allocating water between competitive uses and users, whether farmers, industrialists, municipalities, or others, has been the responsibility performed by State government and regulated by State law.

With greater use by home and farm industry, water consumption is increasing from an approximate 250 billion gallons daily use to an estimated 450 billion or more gallons of water per day by 1975.

CONCLUSION

In conclusion, the works that we build today must be compatible with plans to satisfy future needs. We must make an effort to obtain the fullest possible advantage of multiple purpose project development.

We have tremendous shorelines on the new lakes that have formed and are forming, which will provide recreational facilities.

Wildlife in South Dakota is increasing, deer, antelope, and other small game have shown tremendous increases in the past decade.

The demand for more water for domestic, industrial, and irrigation uses in our State will continue to increase.

Desalination of brackish water for domestic use or of saline water for irrigation uses, now in the experimental stage, while important, may be applicable to only a few areas in South Dakota. However, we recognize its increasing importance to all States.

The South Dakota Reclamation Association urges that serious consideration be given to the drought situation which now exists within the State and the need for taking steps to correct, as far as possible, that condition through the development of our water resources at the earliest possible date.

Senator CASE. Our next witness on the list as presented is Colonel Hammond, representing the Corps of Engineers. I might say in passing that Maj. Gen. Keith Barney, the division engineer, has discussed this hearing with me and regretted that a previous commitment prevented him from being here. However, he assigned his assistant, Colonel Hammond, who is the engineer most directly concerned and most knowledgeable to discuss the details of the entire Missouri River Basin program with the committee. We are particularly fortunate that Colonel Hammond can be here this morning to represent the Corps of Engineers.

STATEMENT OF COL. DAVID HAMMOND, DISTRICT ENGINEER, OMAHA DISTRICT, CORPS OF ENGINEERS, U.S. ARMY, OMAHA, NEBR.

Colonel HAMMOND. Thank you, Senator Case.

Senator Kerr, Senator Hart, and Senator Case, the Corps of Engineers, in its role as technical consultant to the Congress, frequently meets with the local people to discuss their water problems. However, it is seldom that we have the opportunity to meet jointly with Members of the Congress and the people who have water problems to discuss. This is the situation today, and I feel it is a distinct privilege for me to have this opportunity to discuss our work before this committee and before the interested local people who have water problems.

Although I will speak mostly of the work of the Omaha district, since that is my particular sphere, I will make a brief reference to the larger basin in which we operate.

To our right on the stage we have a colored chart outlining the basin, an area roughtly one-sixth of that of the entire Nation in geography, the Missouri River extending from its origin in Montana down to the Mississippi River, a distance of some 2,500 miles.

The CHAIRMAN. What is the relative percentage that this area represents of the Nation's total area?

Colonel HAMMOND. About one-sixth, sir.

The CHAIRMAN. As I look at it, it occurs to me that it represents an area all of which was in the Louisiana Purchase.

Colonel HAMMOND. I believe that is correct; yes, sir.

The CHAIRMAN. Do you happen to know what percentage this area represents of the total area acquired by the so-called Louisiana Purchase?

Colonel HAMMOND. No, sir; I do not.

The CHAIRMAN. Is there an expert geographer here who can give us that information? I must say it dramatizes the significance of that deal.

Colonel HAMMOND. We can get that figure.

The CHAIRMAN. As I understand it, Thomas Jefferson made it without being shown constitutional or statutory authority. He agreed to pay $7 million we did not have to a power that sold it to him while they did not own it. I feel that was quite a deal.

Senator CASE. It certainly was, Senator, and the lake that was created by the Gavins Point Dam again has been named the Lewis and Clark Lake by congressional enactment in recognition of the fact that following the purchase one of the first things that was done was for Lewis and Clark to make their expedition up the length of the Missouri River, covering by the then best available means of transportation a great portion of the Louisiana Purchase.

Colonel HAMMOND. There are some 529,000 square miles in the Missouri River Basin and approximately 200,000 of these, or about 40 percent, are the responsibility of the Omaha district. Putting it in river-miles, there are about 450 miles of the 2,500 miles in the State of South Dakota, 1,200 above South Dakota, and 850 miles below. So South Dakota is near the midpoint of the river and lit-

erally in the center of the problems associated with the Missouri River and the entire Missouri Basin.

In addition to our program of military construction in seven States, the Omaha district has a large civil works program dealing exclusively with water resources. Construction activity to date has been primarily centered about the main stem projects. I would run over these briefly.

They include Fort Peck Dam in Montana, which was the "granddaddy," in operation since 1938, with a storage capacity of 19.4 million acre-feet.

Garrison Dam in North Dakota, which is now essentially complete, with a capacity of 24.6 million acre-feet.

Oahe Dam near Pierre, with a capacity of 25.6 million acre-feet, which is scheduled for completion in 1965, with an earlier beginning of power generation.

Big Ben Dam near Chamberlain, S. Dak., which is just starting this year, which is scheduled for completion in 1966. Fort Randall Dam near Lake Andes, S. Dak., virtually completed in 1956, with a storage capacity of 6.1 million acre-feet.

And Gavins Point Dam near Yankton, S. Dak., on one border, and Nebraska on the other, completed in 1957, with a storage capacity of 540,000 acre-feet; this, being the most downstream of the reservoirs to mainstream, acts as a reregulating reservoir and is our last opportunity to control the use of the water in the Missouri.

The CHAIRMAN. Colonel, is the Oahe a larger dam than Garrison? I see its capacity is less.

Colonel HAMMOND. The capacity is less, yes. The embankment is larger. These dams go by various categories, depending on what you are trying to prove, whether it is the largest dam or the largest rolled earthfill or largest rockfill.

The CHAIRMAN. I am trying to get the information. I heard the Oahe referred to as the largest earthfilled dam in our country.

Colonel HAMMOND. The Oahe is the largest rolled earthfilled dam. That refers to the dam itself rather than the reservoir capacity.

The CHAIRMAN. Thank you.

Senator CASE. On the capacity, is that capacity for Garrison the high operating level?

Colonel HAMMOND. That is the high operating level; yes, sir.

Senator CASE. Is it anticipated that it will be operated at that high level immediately? I was thinking of the time we had that controversy over the elevation of Garrison Dam. The final agreement was it would be constructed to the higher elevation, but that for some time it would be operated on the basis of a lower level.

Colonel HAMMOND. That is right, yes, sir, and that is why I was stuttering a little over "immediately," because the controversy had gone on for some years and an agreement was reached about a year ago as to the settlement of the problem. However, the physical construction necessary to allow operation at that higher elevation has not yet been completed. So that will be necessary before the operation at the higher level can go on.

Senator CASE. What is the capacity at the lower level?

Colonel HAMMOND. I do not know what the capacity at the lower level is. As a practical matter, because of the dry cycles that we have

had for the last 5 years, that limitation has not actually come into effect because it would not have been possible to operate at the higher level anyway because the water was not there.

Senator CASE. There is not 5 feet difference in the construction level?

Colonel HAMMOND. I believe it is more than that, sir, but I do not have the exact figure. Garrison is not one of my——

Senator CASE. This 24.6 million acre-feet would be in operation at the authorized higher level.

Colonel HAMMOND. At the authorized higher level, yes, sir.

Senator CASE. But it is not reached at the present time, it is a rather academic question because of the low runoff?

Colonel HAMMOND. That is correct, yes, sir. It has been by agreement to be operated at the lower level, but even that lower level has not been reached because of the dry cycle.

Fort Peck is larger as far as the embankment goes. It was dredge filled rather than filled with machine-placed earth. I think the Peck embankment runs——

The CHAIRMAN. While we are dealing with general information, do you know the source of the word "Oahe" as it is used here?

Colonel HAMMOND. Generally, yes. It is an Indian word. There was a mission called the Oahe Mission, and I believe Oahe means something to the effect of welcome.

The CHAIRMAN. Is there not an Oahe project in Montana spelled differently but pronounced the same?

Colonel HAMMOND. Not that I know of, no, sir, but there may be one.

The CHAIRMAN. Owyhee?

Senator CASE. In Idaho or Oregon, I think.

The CHAIRMAN. Some day I am going to find out the difference between those two.

Senator CASE. Proceed, Colonel.

Colonel HAMMOND. To continue with the brief description of the basin program, the total storage capacity of the main stem system will be 76 million acre-feet. This is approximately three times the annual average flow of the river passing Sioux City. We are proud to have had a hand in developing and constructing this main stem Missouri River system, which makes it possible to utilize water which previously was wasted into the Gulf of Mexico and frequently worse than wasted—it was harmful as it went. Details on these main stem projects and smaller works are contained in the pamphlets on water resources development which we issue for each State.

I have here the one on South Dakota. There is one for each of the States: "The water resources development"—this one is the latest one, January of this year, 1959——

Senator CASE. Colonel Hammond, since you have pointed out the total storage capacity is approximately three times the historic average annual flow of the river, I wonder if you would indicate for the record the fluctuation of the river flow? That is perhaps its low and its highest peaks.

Colonel HAMMOND. I would be glad to supply that information for the record, Senator. I do not have the figure immediately available.

Senator CASE. I will be glad to have it. I think it will be interesting, however, for the record to have that because when we had peak flows of 30 million or perhaps as high as 40 million acre-feet, that is the justification for having this storage capacity so that we can use that in the years of low flow.

Colonel HAMMOND. The fluctuation has been quite wide, yes, sir, and I will supply those figures for the record.

(The information referred to appears on p. 991.)

Colonel HAMMOND. It is not to be unexpected that with the ranges in climate and distance covered in this basin that we also have a wide range in uses and conflicts between opposing needs. Strong demands have been made for conservation from the standpoint of both a saving of water through prevention of waste and a saving by maximum utilization for several purposes. There are, of course, conflicts as to how the water should be used. The use by an irrigator may represent a loss of an existing resource to others in the basin, and conversely the release of water for navigation, power, or pollution abatement, or other uses, may be regarded as a loss by the irrigator. These factors become very important in operation of these resources that we have been talking about here. For this reason there has been established a research control center for the day-to-day operation of the reservoirs in accordance with an annual operating plan developed for a year in advance by representatives of the various States and other interests, including the Federal agencies concerned. It is in this group that all interested in the Missouri River water have their day to be heard as to how the present storage and the anticipated storage for the future year are to be used. Recently this group decided to prepare a 5-year operating schedule based upon current and anticipated reservoir storage in relation to public requirements for water use. This is the attempt by the people of the basin to solve their own problems and take the "long look ahead" while there is still time to do something about it.

I might amplify this here to say this reservoir control center is located in the office of General Barney, the division engineer, where the day-to-day operations are carried on, but there is frequent contact between the group there and the various State representatives, and others interested, who have needs and desires as to how the water should be used.

The annual meetings are really semiannual meetings. There is an annual program prepared, and then after a 6-month period that program is reviewed for the remainder of the year to see whether it is still pertinent or what modifications may be necessary.

Another agency, the Missouri Basin Inter Agency Committee, is another assemblage in which the States and the various Federal agencies regularly meet to coordinate the programs of all the agencies working in the water resources field in the Missouri Basin and to hear the views of local people as to their needs and their desires.

The committee is composed of representatives of seven Federal agencies and of the Governors of the 10 Missouri Basin States. The most recent meeting of the MBIAC was earlier this month in Watertown, S. Dak.

And you attended that meeting, Senator Case.

The divergent factors which I mentioned earlier have to be carefully considered in any planning that we or anyone else does. A good example is the study to be made of the feasibility of slack water navigation. This tentatively envisions a series of low dams to form a practically continuous slack water pool from Gavins Point, the end of the reservoir, to the mouth at St. Louis. Such a project in place of the existing open-river regulation project would permit substantial reduction in navigation season flows and conservation of water which might be used for increased winter season power releases. There is, of course, a limitation on the extent to which releases during the winter might be increased because of the increased hazard from ice jams with high water flows. There are other complications because we must consider the redevelopment of the full power potential, the proper drainage of adjacent lands, measures for preventing or removing sediment deposition in the various pools. One of the major problems would be establishing feasibility on the basis of benefits that might be attributed to the project. On this type of investigation we open the study with a public hearing to determine the desires of most people and before submitting our report to your body we again meet with the people to ascertain whether the proposal is satisfactory to them. Of course we do not limit it to these two meetings. There are frequent consultations with various groups and particular aspects of any study during the several years' course that that study might take.

South Dakota has a particular interest in this sort of planning study, being interested in most of the aspect, including navigation, power, irrigation, as well as municipal water supply, recreation and fish and wildlife benefits.

Typical of the problems encountered in water conservation and our efforts to meet them are the following. I might list a few.

In the design of our flood control project for Sioux Falls, where you will be going tomorrow, a major criteria was that we would not disturb the aquifer for the existing water supply of the city. This is one form of conservation and was the initial consideration in the formal utilization of the local flood protection project for that city.

A large portion of the James River Valley, of which you have heard something this morning, is interested in irrigation development, using principally water imported from Oahe or Garrison Reservoirs on the Missouri River. Here we in the corps are working toward multiple-purpose development by assisting the Bureau of Reclamation and the local people in measures for handling the return flows that might also be used for the control of floodflows.

You might be interested in some application of this illustration of our cooperative studies. In this particular one we are somewhat the tail to the kite, but a necessary factor, in the development of this overall project which has been mentioned here. The current plans for the Oahe project provide for pumping surplus waters of the James River into a reservoir at the existing Lake Byron with the idea of reusing it on lands to the east and the north. At an early stage of the study the corps and the Bureau both saw the possibilities offered by this scheme from a flood control standpoint by pumping off the peaks of the floodflow. After investigations we found that the scheme did appear feasible, could be operated to effect substantial reduction in flood

damages in the James Valley below Huron. This is an essential point because the benefits to be attributed to any flood reduction derive from the reduction of flood damages in the valley principally below Huron.

Senator CASE. Colonel Hammond, at this point you heard the presentation by the mayor and Mr. Ruddy with their references to the Lake Byron project this morning?

Colonel HAMMOND. Yes, sir.

Senator CASE. You were present while they presented it?

Colonel HAMMOND. Yes, sir.

Senator CASE. I am going to ask you a question, and I do not want you to answer it now unless you think you can answer it authoritatively, but I would like to have an answer presented for the committee, or by letter to the chairman later. That is, whether or not you will consider a project substantially as they outlined for the Lake Byron development to be specifically authorized under the general authorization of the Flood Control Act of 1944 and to which the provisions of the water supply title of the Rivers and Harbors Act of 1958 could be applied. That is, will it be necessary in your judgment to secure an independent and special authorization for reauthorization or could it be considered as authorized by the basic Missouri River program and thereby be eligible for consideration or funding without a separate or special authorization?

Colonel HAMMOND. All right, sir. I understand the question. I could not answer it authoritatively now, and I will furnish you a letter of reply to the committee.

Senator CASE. There is a good deal of logical interest on that. If we could proceed to the funding stage with a feasible report by the Bureau of Reclamation and/or by your agency it would be considerable help to the committee.

Colonel HAMMOND. All right, sir. I will furnish that. As other examples of water resources development projects, not in this State, but still in this basin, in the South Platte River in Colorado, we are working with local people in an attempt to develop a master plan for future utilization in a water-short region. We see this as the responsibility of a State group which would coordinate the overall program with each agency doing only the work in its primary sphere of interest.

I might add here that this is an area which certainly exemplifies what Senator Kerr opened with by talking about the population is expanding rapidly and the water resources are diminishing. We feel that nothing short of a complete master plan will be satisfactory to solve a problem of this kind.

In the headwaters of the Grande River, N. Dak., we are studying the potential Bowman-Halley project which would have for a major purpose the provision of municipal and industrial water supplies for the adjoining region.

The CHAIRMAN. Will you wait until I get the picture of where the Grande is?

Colonel HAMMOND. This project is very typical of those that will be affected by title III of the 1958 act, because without the provisions put in that act no consideration would be possible even for a project in this area. With those provisions it is potentially possible to have

a project developed here, but the questions that have to be resolved become now the basis for future projections and how validly we can make you convinced that they are.

I mentioned this because it had been mentioned, both Senator Kerr and Senator Case were the cosponsors of this title III act, and here is a very good example of where the act makes possible a project that otherwise had no economic feasibility and no likelihood of ever having any.

Also authorized but not yet started is a study for the utilization of Missouri River waters in South Dakota. This study would be directed toward the improvement of existing lakes and water supplies in the lands west of the Missouri River.

South Dakota has flood control needs. Mr. Grimes mentioned some of these earlier. When the studies underway are completed, the whole State will have been fairly well explored. As, for example, on the Fall River we have authorized Cottonwood Springs Dam yet to be constructed. This will complete a three-unit plan for the protection of Hot Springs.

Russ, do you want to point out where these places are?

In the Cheyenne Basin, a new channel and levee project for Bell Fourche will soon be recommended to Congress. This will supplement the existing project which was the first local project to be built in our district, the Omaha district. The project for the Vermillion River, which Mr. Grimes mentioned, is recommended in a report which is soon to be considered by the Board of Engineers for Rivers and Harbors.

Senator CASE. Might I interrupt just at that point?

Colonel Hammond, as to this review by the Board of Engineers for Rivers and Harbors, a hearing is to be held, I believe, in November.

Colonel HAMMOND. I believe November; yes, sir.

Senator CASE. There may be people in the audience here interested in that Vermillion River project. If they have any comments it will be appropriate for them to send their comments to you or to the Board at Washington?

Colonel HAMMOND. To the board at Washington, Senator Case.

Senator CASE. To the Board of Engineers for Rivers and Harbors?

Colonel HAMMOND. Yes.

Senator CASE. In care of the Chief of Engineers, General Itschner, in Washington.

Colonel HAMMOND. Washington, D.C.; yes, sir.

Senator CASE. Thank you.

Colonel HAMMOND. We are now completing reports for improvement of the lower Big Sioux River and, as a part of that, a local protection project for Hawarden, which is in Iowa. The big problem area for which an economically feasible solution is still somewhat obscure is the very one most mentioned here, the James River, which was referred to earlier in connection with irrigation.

The irrigation feasibility studies have to be pretty well firmed up before the flood control conclusions can be reached; most of the water to be handled for flood prevention will be irrigation return flows rather than natural flows from the James.

On water supply, we have been given the additional latitude that was mentioned in planning by the Water Supply Act of 1958, the

title III which was mentioned. This was a major step forward in conservation because it permits provision to be made now for a water that would be contracted for at a later date. There are safeguards for the Federal investment that will prevent some forms of development for which definite needs cannot be forecast. In other words, it may not be possible to show completely now all the uses which might later develop.

Recreation is a subject which is becoming increasingly important. Through cooperation with the States of Nebraska and South Dakota, there are now developments at Gavins Point Reservoir that attract many thousands of visitors annually. And these numbers go up almost unbelievably each year. We had something like 1,300,000 visitors last year. It will go well over 1,750,000 this year. It has been only recently that recreation has been considered a major purpose in our projects. But we consider now that the provisions for storage for other uses should also be utilized to the maximum for recreation. But in many cases this utilization for recreation may still depend on a feasibility which has to be established on the basis of other uses, such as municipal and industrial water supply, flood control, and so forth.

Throughout the basin, most of the sites that can be developed for storage at low cost have already been utilized. Full development of our remaining water resources will require more expensive storage. This will be so as the years go on. The future storage projects, therefore, may require either increased subsidies in some form or a recognition of other benefits not previously allocable for deciding whether a project is worth while or not.

There is also an increasing problem of encroachment upon reservoir sites in the period between authorization of the project and the initiation of construction. We had several examples in our district where new residential or industrial developments have been located in a previously reservoir area. Their project of their relocation would be so expensive that it is necessary to either move upstream, if that is possible at all, to a site having less value for flood control, or for water storage, or to abandon completely a reservoir in that particular area.

Our existing water policy provides a basis for comprehensive development of the basin. Administrative agencies, such as the Corps of Engineers, work within the framework of that policy. Hearings such as this one today may indicate to you adjustments of that policy to meet changing objectives. We wish to assure you that the corps is alert to the responsibilities that have been assigned to it and intends to continue in its planning and construction to work with local groups such as this and with the Congress.

I thank you.

Senator CASE. Thank you very much, Colonel Hammond.

Are there any questions or comments, Senator Kerr?

Senator Hart?

Will you be here during the balance of the day?

Colonel HAMMOND. I will, yes, sir.

Senator CASE. In case any questions come up, you will be here and we can refer them to you?

Colonel HAMMOND. Yes.

Senator CASE. Thank you very much.

STATEMENT PREPARED BY DIVISION ENGINEER, MISSOURI RIVER DIVISION, CORPS OF ENGINEERS, IN RESPONSE TO A REQUEST BY SENATOR CASE

In connection with the Lake Byron project, now being studied by the U.S. Bureau of Reclamation as a unit of the authorized Oahe irrigation project and, on which early construction is desired by the city of Huron, the Senator asked (1) whether there was specific authority for the construction of the Lake Byron Dam and Reservoir, (2) whether it was eligible for funding and construction by either the corps or the Bureau of Reclamation, and (3) to what extent the provisions of title III of the 1958 Flood Control Act could be applied. No specific mention of the Lake Byron unit was found in any authorizing act and it is suggested that any statement regarding present authorization, or the need of supplemental approval by the Congress, originate with the Bureau of Reclamation. Also, there is at present no authority that would permit construction of the Lake Byron project by the Corps of Engineers nor would that project be eligible for funding for advanced planning. The provisions of title III could be utilized in making investigations of present or future needs for municipal or industrial water. However, there appears to be no reason to invoke the provisions for future construction unless the Lake Byron Dam and related works are to be placed in operation a significant time in advance of the remainder of the Oahe irrigation project.

Senator Case also indicated, prior to the Sioux Falls hearing, that a resolution requesting a report from the corps on the Lake Byron project was being considered and desired recommendations of the Corps of Engineers in framing an appropriate resolution. Accordingly, a representative of the district engineer met with Mr. John L. Mutz, technical consultant for the Senate Public Works Committee, to discuss the problems involved. They are summarized below for the benefit of the committee. A report on the Lake Byron project could be prepared under the authority of current investigation on the James River, N. Dak. and S. Dak., by the Corps of Engineers. However, it is believed that such a report would not advance the time for possible construction for the following reasons:

(a) Storage is an expensive means for providing flood control on a river like the James, where the volume of water in the flood is relatively high in comparison to the peak discharge of the flood. Furthermore, the district engineer found, during recent cooperative investigations with the Bureau of Reclamation, that lack of concentrations of damageable values downstream from Huron precluded justification of specific provisions for flood control storage capacity in Lake Bryon. Plans under consideration by the Bureau would provide additional storage in this offstream natural lake, which by virtue of its location near the lands proposed to be irrigated would then provide regulation of flows near enough to the east lake plain lands to facilitate day-to-day operation. It would also provide a means of storing irrigation return flows from the lake plain for use as part of the irrigation water supply. These flows would be pumped into the lake by means of a pumping plant located nearby on the James River. This pumping plant may be used during periods of high water on the James to remove water from the flood crest and store it in Lake Byron. Such a plan may be economically justified because the proposed pumping, storage, and distribution facilities of the Bureau could be used and the water could be utilized for irrigation purposes and water supply. No added features are required for flood control and the flood control benefits are in effect a bonus value for the irrigation project.

(b) If the corps were to develop a project, a showing of economic feasibility would still be contingent upon being able to use the water for irrigation and in accordance with the provisions of section 8 of the Flood Control Act approved December 22, 1944, this would require a report and finding by the Secretary of Interior that the water could be used in a feasible irrigation project. This could be either the Oahe project now under study by the Bureau or a similar project, but the Corps of Engineers would be unable to recommend a project to provide irrigation storage without a Bureau project to use that water, and it is considered the work at Lake Byron could not be justified on the basis of flood control and water supply benefits alone. Therefore, there would be little time advantage toward start of construction in the Huron area by a new directive to the corps.

At another stage of the hearing at Huron, Colonel Hammond, district engineer at Omaha, mentioned that the average annual runoff of the Missouri River above

Sioux City was about 24 million acre-feet, and that the main stem reservoir system would have a storage capacity about three times that magnitude. Senator Case then asked that he supplement his statement by supplying the committee with some data on maximum and minimum flows. These data are as follows:

Maximum annual, 36,700,000 acre-feet in 1927; minimum annual, 11,289,000 acre-feet in 1940.

Maximum instantaneous, 441,000 cubic feet per second on April 14, 1952; minimum, 2,500 cubic feet per second on December 29, 1941.

These data are based on information published by the U.S. Geological Survey; their annual estimates are available from the 1898 water year to the present. The daily and instantaneous records were obtained at Sioux City only from September 1928 to September 1931 and from October 1938 to the present. A review of unpublished studies and estimates of events occurring at times not covered by the Geological Survey indicates that the annual runoff record of 1927 was probably exceeded in 1881; the Corps of Engineers estimate that the runoff was about 40 million acre-feet in the 5-month period March–July in that year. There is convincing evidence that the 1952 peak flow has not been exceeded since this part of the country was settled.

Senator CASE. The next witness is Mr. Harold Williams of Geddes, S. Dak., representing Charles Mix County Irrigation Committee.

In presenting Mr. Williams to the committee, Mr. Chairman, I should like to observe that in most projects it takes some person in a whole area to be the sparkplug. I can assure you that Harold Williams has been the sparkplug of organizing the interest or bringing together the people who are interested in the project I assume he wants to discuss.

Mr. Williams.

STATEMENT OF HAROLD WILLIAMS, CHAIRMAN, CHARLES MIX COUNTY IRRIGATION COMMITTEE, GEDDES, S. DAK.

Mr. WILLIAMS. Mr. Chairman, members of the committee, as was stated, my name is Harold Williams of Charles Mix County. I represent the Charles Mix County Irrigation Committee as chairman. The statement I have presented I am not going to read. I am just going to comment on it, because there are several things that I would like to interpose as we go along.

We represent a little different area, a little different approach to the water development program than has been presented here definitely previously. Mr. Ruddy covered many of the reasons for irrigation. We would like to say that we endorse every one of them heartily. The project in Charles Mix County by way of description was begun in 1956. We had wonderful cooperation and are having wonderful cooperation from our congressional delegation. Primarily it is composed of about 30,000 acres of irrigable land. That amount may be varied as the investigations continue. It looks now to be approximately that amount. As far as water needs, we roughly consider now we will need approximately 60,000 acre-feet of water per year. When it is completed, this amount will be taken from Fort Randall Dam by way of ditches, with power supplied from the Fort Randall powerplant. This is a relatively small unit and illustrative of that is the fact that the total amount taken from the dam would require 200 years of pumping to empty the dam. But in determination of importance we believe that it is very important for the simple reason, as far as we know, there are no other Federal projects of this nature

so far constructed along the Missouri River. This would be the first. As such it would serve as probably the demonstration or pilot project as to what could be expected from pumping units of this kind.

That is a general description of the area. It is broken down into two units. The Wagner unit, in the central part, south central part of the county, consisting of the larger amount of about 24,000 acres, that area is and has been under investigation by the Bureau of Reclamation. I understand that a feasibility report is due in 1961. There, incidentally, that would require a 150-foot lift of water, which is considerably less than the other unit at Geddes, which would require a 290-foot lift. The Geddes unit is about 7,200 acres in area. That unit has been partially investigated and there are some doubts as to the economic feasibility of the unit because of the high lift and because of other factors. However, the interest there is very great. The farmers are repeatedly urging that funds be made available to complete the investigation in order that they may know the boundaries and the exact status of the cost. At present no definite cost status had been available, because of the incomplete investigations. Recently we understand that investigations have been resumed and it is the proposal of the committee that these investigations be continued as fast as possible, as fast as funds can be made available in order that this smaller area might be put into operation.

The funds have been slow in coming, we understand, for this particular area because it is marginal.

In that connection, our rainfall, as pointed out before, is between 16 and 20 inches per year. That probably would be sufficient except that it comes sometimes when it is not very useable. This year was one of the years. I think the crop is averaging zero to 10 bushels per acre in that area as it is in other areas of southern South Dakota. The dam has been completed for some time and the water is available. That is one reason why we feel that speed is necessary to eliminate these drought years.

We are not asking for a new area to be irrigated merely to establish the areas that we have. Argument has been advanced that perhaps we would add to the surpluses if these areas are put into production. As a matter of fact, in actual practice, we believe that it would decrease the surpluses, because we would have a choice of crops. At present we have no choice. We have to raise those crops which are in surplus. Under irrigation we would be able to raise various forage crops and others which would not add to the surplus condition.

There are fringe benefits in this project. We have made mention here of restoration of lakes or restoration of lakes or improving of lakes. We have one town in that area which is now dry. It is Lake Andes and as a fringe benefit of these irrigation projects that lake could be restored. It is a big lake and serves all of southeastern South Dakota. I think we had 1,700 names on petitions urging the restoration of that lake last year. That could be done very easily as an incidental benefit of these projects.

As far as cost goes, the farmers have stated that they are able and willing to pay at least $10 per acre and perhaps more, if necessary, for irrigated acres for this project.

I have some other figures in the prepared statement which you perhaps have noted.

Time is getting short so I am not going to go into those right now. If there are questions I will be glad to answer them. I would like to say, though, before closing that we are very happy to have had this opportunity to present these facts to the committee, and we hope that we can proceed with our investigations at an early date for completion.

Senator CASE. Mr. Williams, we want to thank you for your presentation and in addition to what you have said, I think your formal statement should be incorporated in the record, and without objection, that will be done.

Mr. WILLIAMS. Yes.

(The statement referred to follows:)

STATEMENT OF CHARLES MIX COUNTY IRRIGATION COMMITTEE

Charles Mix County will need at least 60,000 acre-feet of water annually for irrigation when and if present projects now under investigation are completed. It is the hope of the committee that funds for the early completion of this will be made available at an early date. Two projects are under investigation in Charles Mix County:

(1) The Wagner unit of the BCB, consisting of approximately 24,000 acres surrounding the city of Wagner, S. Dak. This unit is now undergoing detailed investigation by the Bureau of Reclamation with the feasibility report scheduled for 1961. Water will be supplied from Fort Randall Dam at a total delivered cost which should not exceed $10 per acre per year. Current from the Fort Randall powerplant will provide power for the 150-foot lift.

(2) The Geddes unit, consisting of approximately 7,200 acres surrounding the city of Geddes, S. Dak. This unit was begun at the request of Geddes farmers in 1956 and preliminary drainability surveys by the Bureau showed an estimated 7,200 acres with favorable drainage possibilities. At this point the work on this unit began to lag because there was some concern regarding the 290-foot lift at the pump site near the mouth of Pease Creek. In spite of constant requests for resumption of the work by the farmers of the area, work was suspended until the fall of 1958 when a detailed survey was made on two adjoining sections of the area. This survey revealed 400 acres of class 3 land, 250 acres of class 2 land, and 50 acres of class 1 land. The Bureau felt that if this were a representative sample of the area that it would be economically unfeasible and work was again suspended. Farmers again urged that the work be resumed and after a summer of inactivity, we have been informed that further investigations are now under way. It is the firm belief of farmers of this area that the Geddes unit be surveyed in detail before any firm decisions are made regarding its feasibility.

They have further stated, via petitions, that they are both willing and able to pay operation and maintenance costs up to $10 per acre per year.

The Charles Mix County Irrigation Committee, by resolution, recommended that the Geddes unit be thoroughly investigated as soon as possible with a view to completing a portion of same as a pilot, experimental, or demonstration project. It is small, is centrally located, has soil quite typical of the entire area, and it is definitely an area of marginal rainfall.

The restoration of the level of Lake Andes, now dry, could easily be accomplished in conjunction with one or both of the above projects. Petitions bearing some 1,700 names requesting restoration of this were submitted last year. If this were done, a famous recreation area serving all of southeastern South Dakota would again be enjoyed by thousands each year.

Senator CASE. This area is a part of the so-called BCB program, the Brule-Charles Mix-Bon Homme County program which was endorsed in a resolution passed by the Senate for accelerating the water use program in various parts of the country. I think under the intent of that resolution is what you have asked for here—that surveys and studies be speeded and some firm decisions made. It is thoroughly consistent with the intent of that resolution which was adopted by the Senate. I might say for the record and for the other members

of the committee that Charles Mix County, in years of good rainfall, is one of the most productive areas in the State. In the years when we have the downs of our ups and downs it becomes a marginal area. During the thirties, the Federal Government poured large sums of money into Charles Mix County by way of grants and relief work programs. In my judgment, stabilization of the agriculture in that area would, in the long, run save the Federal Government large sums of money and contribute to the material well-being of many, many homes.

Are there any questions or comments? If not, thank you very much, Mr. Williams.

Mr. Delbert Wells, representing the Farm Bureau of the State of South Dakota. While Wells is coming up, may I ask if someone is coming up from the Yankton Chamber of Commerce? I have the Yankton chamber listed but do not have the name of the witness.

STATEMENT OF DELBERT WELLS, REPRESENTING THE FARM BUREAU OF THE STATE OF SOUTH DAKOTA

Mr. WELLS. Senator Kerr, Senator Case, Senator Hart, I would like to comment before I start on this prepared statement to say that our State president, John Foster, is in the back of the room but his voice is in such shape that it is almost impossible for him to talk today. Apparently he has been out chasing pheasants also. I might likewise say one of my coworkers from Minnesota, Mr. Dale Nelson, will be on your program later and this report pertains to the South Dakota Farm Bureau, primarily.

To Honorable Senator Kerr, Senator Case, and other committee members; it is a pleasure to appear on behalf of the 3,227 member families in South Dakota Farm Bureau. These members are from 30 organized county Farm Bureau's with all areas of the State being represented. I shall attempt to convey accurately the thinking of our membership on this matter so far as possible.

Your recent letter indicated that your committee was interested in several major factors; namely, the quantity of water development needed, when it is needed, where it is needed, what should be the pattern of future development and what are the limits of expenditures justified in this field. Your letter also stated that these were prime factors for consideration but that the hearing was not necessarily limited to these.

In preparation for this report, we have reviewed some of the recent bills dealing with water rights and also considerable of the information on water resources put out by the U.S. Geological Survey, as well as Farm Bureau resolutions and policies dealing with water.

Probably known to the committee, but of direct interest in the South Dakota water picture are these facts as published by the Geological Survey:

(1) Average annual precipitation in United States is 30 inches per year with only about 9 inches being classed as manageable water.

(2) There is currently about 270 billion gallons of water used per day in the United States. It is estimated that this demand will increase to 600 billion per day by 1980. It is reported that the Eastern States will increase their consumptive use by 200 percent, whereas the West will increase their water use only 50 percent.

The major problem here is that very little of the water in the West will be returned to normal stream and lake flows due to the fact it is used for irrigation, while in the East industrial uses does return much of the water although it is badly polluted. This poses different problems in the different areas.

With the coming completion in South Dakota of the Missouri River Dam and lakes chain of projects, we are now at the place where we should take a further look at the future of the water supply and its uses in South Dakota and certainly you are to be congratulated on holding this hearing at this time.

It is our judgment that normal average annual rainfall and snow runoff in North and South Dakota should be enough to maintain the lakes and do a considerable job of charging the ground water supply with some for irrigation as far as South Dakota is concerned. Much water has previously been lost from hard rains and fast melting snows in the spring. Much of it escaped from the Missouri River. The big Oahe Dam with its superreservoir and the others below should act as a "stepdown" operation to keep the water flowing at a constant rate, while at the same time maintaining a good supply of headwater in South Dakota.

It would now be our recommendation that in the future an increased share of the Federal and State appropriations be given to upstream protection and flood control projects. It has come to our attention that about $25 had been appropriated for downstream work as contrasted to $1 for upstream work.

On this basis we recommend that increased proportion of the total funds appropriated for water utilization programs be provided for planning, development and construction of projects under the Watershed and Flood Prevention Act. Here again, it is our opinion that we can increase the effectiveness of the local watershed districts and consequently the farmers' income and the regional stability without jeopardizing the big Missouri River responsibilities.

We believe that proper watershed management, numerous small and medium dams, which can and should be built by local watershed districts in cooperation with State and Federal if necessary, and good land practices will do much to stabilize agriculture, and consequently industry, in South Dakota.

We believe also that these numerous, scattered smaller dams will help charge the aquifers for good ground water supply, especially away from the river projects and will lend considerable stability in water supplies for both cities and farm operators.

We would hesitate at this time to comment on the needs for dollar appropriations from the Federal Government; however, it should be sufficient to implement the Watershed Act as fast as the projects can be worked up for it by the appropriate agencies and organizations.

South Dakota is presently a population vacuum State. It will generate population only as fast as there are jobs developed. In our judgment, with the completion of the Oahe and Big Bend Dams, our industrial water supply could then be in excess of our agricultural supply. This is another reason why we believe that much more emphasis should be put on upstream or headwater projects.

Future industry in South Dakota will probably be based on farm-produced raw products because of the limitation in the presently

known mineral supplies in South Dakota and the limitations on timber products.

It has been fair that the Missouri and some of the other rivers have been harnessed in South Dakota. The next major efforts should be on the minor streams through the watershed flood control plan.

We would like to comment further in this testimony regarding the battle that is going on in Congress over water rights. You are, no doubt, entirely familiar with previous farm bureau testimonies regarding who should own or control the water in the United States. I might mention here on the national level is what I intended to say there.

You will recall that last spring, Senators Moss, Bennett, Case, Mundt, Dworshak, and Hruska, accompanied by several Republican and Democratic Congressmen, introduced a water rights bill which farm bureau supported very strongly. In brief, this bill came up very near to fitting farm bureau positions wherein the States would have considerable jurisdiction over the water within their boundaries. It was very much in line with the original Barrett bill. We believe that water rights and water right laws should be brought to the attention of you committee members because, no doubt, some of the recommendations that are made to you on this series of meetings will be consistent with the belief that the Federal Government should own or control all of the water within the United States irrespective of State water laws. Your future legislation in the water field will be guided partially by this problem of who will own and control the water.

Quoting a farm bureau resolution:

(1) We favor the maximum participation of individuals, local agencies, and local governments in the development of water projects. Federal development in water development projects should be in cooperation with State and local interests. We are opposed to Federal domination of water resource developments. (*a*) Project planning should be on an integrated, multiple-purpose watershed basis. This may be accomplished by the creation of Federal-State river commissions with responsibility for planning.

As a further guide to farm bureau ideas on the problem at hand I quote from the 1959 policies:

(3) We favor the general principle that revenues from related projects in a watershed basin should be paid into a basin account to further maximum development of land and water resources in the watershed.

With these three quotations as guides, we ask that your future proposals for development and spending for water projects be consistent with the ideas of State or local control, as well as a high degree of local financing.

We do not care at this time to discuss further the various water right bills, whether we agree or disagree; however, since you gentlemen represent the four major Senate committees, which have primary responsibilities in the water resources field, it is well that you solve, or at least consider wisely, the basic problem of water rights and water ownership before future projects are planned or allocation for new projects are made. This decision will affect how you move and what you do in the water resources field.

Our South Dakota Farm Bureau Convention will be held on November 15 and 16. If new proposals are made at that time, which have a bearing on the subject, we ask permission to file a supplemental statement at that time.

Thanks.

Senator CASE. Thank you very much, Mr. Wells, for presenting Mr. Foster's statement.

With respect to a couple of items which you mentioned, I might say that Senator Kerr and I participated in the conference when the Watershed Protection and Flood Prevention Act was adopted. You were talking to sympathetic listeners when you asked that a better proportion of the funds appropriated for water utilization be provided for the planning, development, and construction of projects under that watershed program.

The second thing I would mention with respect to water rights is that when we had the omnibus bill in the Senate, at one time we contemplated trying to incorporate a definitive section on water rights. There was disagreement among some of the representatives in some of the Western States as to just how it should be worded and the final issue was left unsettled. It was largely due to the difference of opinion as to the interpretation of certain clauses, so that the bill which was introduced last spring attempted to be more specific on that and your comment on that is particularly welcome.

With regard to the proposals that may be adopted by the farm bureau at its annual State conference in November, that will be before the committee has completed its hearings and I am sure if you have some supplemental statement you want to present at this time the committee will incorporate it as you may present it.

Mr. WELLS. Yes, sir.

Senator CASE. Is there further comment or suggestions?

If not, thank you very much.

Mr. WELLS. Thank you.

Senator CASE. The testimony of the Yankton Chamber of Commerce will be placed in the record at this point.

TESTIMONY BY THE YANKTON CHAMBER OF COMMERCE

Mr. Chairman, members of the committee, ladies and gentlemen, I am Warren Hobson, manager of the Yankton, S. Dak., Chamber of Commerce. I would like to introduce two other gentlemen whom I have with me today. Mr. Charles Danforth, chairman of the board of the Mississippi Valley Association, and Willis Couch, chairman of the Missouri River committee of the Yankton Chamber of Commerce.

We appreciate this opportunity of appearing before this Select Committee on National Water Resources to present the position of a community situated on the Missouri river which is vitally affected by legislation relative to its control and use.

We strongly urge the acceleration and early completion of the entire comprehensive development program in the Missouri River Basin.

We strongly urge Congress to make appropriations available, not only to carry out the orderly and prompt completion of the flood control and water conservation projects already authorized by Congress, but also to make funds available to the Corps of Engineers, the Bureau of Reclamation, the Department of Agriculture, and other appropriate agencies for the early completion of plans for additional projects necessary to realize the full benefits of flood control, navigation, irrigation, recreation, soil conservation, and hydroelectric power.

We support constructive programs designed to solve the Missouri River Basin's particular problems of water polution.

We oppose any specific legislation which would modify the engineering and integrated functions of various projects as recommended by the Corps of Engineers, the Bureau of Reclamation, and other responsible agencies. In addition, we urge the fullest development of recreational facilities on all reservoirs.

We urge Congress to accelerate appropriations for channel and bank stabilization work from Gavins Point Dam above Yankton to the mouth of the river. The tremendous loss of land by bank erosion from Gavins Point Dam to Sioux City, Iowa, has increased considerably since the closure and operation of the dam. We urge that Congress continue to appropriate necessary funds for continued study of bank protection and stabilization on this unimproved portion of the river.

In addition, we recommend early completion of the authorized 9-foot channel to Sioux City, Iowa, and are opposed to any restriction which might delay its early completion. Also, we urge that an early completion be made of the survey report of the Corps of Engineers on the engineering and economic feasibility of navigation from Sioux City to Yankton, S. Dak., which would become the headwaters of Missouri River navigation.

Donald O'Toole, president of the Pullman Trust & Savings Bank of Chicago, stated in an Associated Press release that "The Missouri River is the key to the future industrial growth of cities along that waterway. If the Missouri River were as well controlled as rivers in the east are, there could be a similar concentration of industry on it." It is a known fact that it takes less energy to move goods by water than by any other medium. Traffic on the Missouri has increased from 152,000 tons in 1953 to 596,116 tons in 1958, and promises to increase this year and years to come with the completion of the programed stabilization projects which will create a controlled 9-foot channel designed to scour itself. Unfortunately, the maximum development of the Missouri Valley's potential has been retarded in the past by conflict of interests in the various States.

In addition, we recommend the full development of irrigable areas which will increase forage crops, livestock, and cash crops. The annual gross farm income will be increased and subsequent land values will increase. The improved tax base will yield millions of dollars of additional annual State and local taxes. Local business will be strengthened by furnishing supplies to farmers and marketing farm products, thus supporting significant increase in urban population. This local business, and the continuing program extending over half a century will provide a constant demand for materials and equipment from suppliers throughout the Nation. Studies of existing projects demonstrate that the development of irrigation provides a catalyst for regional economic development, improvement of living conditions, and enhancement of social values.

It is our request that the Congress of the United States will continue to consider and maintain its previous role of representing the electorate and consequently passing legislation that will bring about better economic conditions of this country.

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Mr. Woodward.

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Mr. WOODWARD. Senators Kerr, Case, and Hart, it is a privilege and pleasure for me to appear before you today and I appreciate this opportunity to meet with your committee.

During the past two decades, South Dakota's water resources have received more attention than any of the State's other natural resources. Today, this Great Plains State is the scene of a widely diversified series of water resource development programs, ranging from the construction of multiple-use reservoirs on the Missouri for purposes of flood control, irrigation, and hydroelectric power generation to a series of small watershed and channel improvement projects scattered throughout the State.

Most of these water development projects are currently the responsibilities of several Federal agencies. Only recently have State organization agencies begun to influence these activities, though it is

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Mr. Woodward.

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Mr. WOODWARD. Senators Kerr, Case, and Hart, it is a privilege and pleasure for me to appear before you today and I appreciate this opportunity to meet with your committee.

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Most of these water development projects are currently the responsibilities of several Federal agencies. Only recently have State organization agencies begun to influence these activities, though it is

now apparent that the economic future of the State will be tied closely to these developments.

The department of game, fish, and parks, which is the State agency most directly responsible for the future of South Dakota's recreational resources, has viewed the developing water program in South Dakota with mixed emotions. For all of the advantages already being enjoyed by South Dakotans as a result of these projects, some serious deficiencies are noticeable. Unless corrective measures are taken on both present and future water development programs in this State, these deficiencies could well result in greatly reduced recreational benefits for the public at large.

The South Dakota Game, Fish, and Parks Department welcomed the 1958 amendments to the Coordination Act, permitting enhancement of the fish and wildlife values in Federal water resource development projects. We welcomed, too, the fish and wildlife amendment to the Small Watershed Act which makes it possible for 50 percent cost sharing on fish and wildlife installations in watershed projects. However, in several areas in South Dakota, projects are being carried out within the same vicinity by various Federal agencies with an apparent lack of liaison between these Federal agencies and a corresponding lack of liaison between the State and Federal agencies which have interests in the projects. It is strongly recommended that the committee, in considering State and national programs dealing with water conservation and development, first appraise this problem of agency liaison as a necessary and vital prerequisite to any action programs contemplated.

The Department of Game, Fish, and Parks of South Dakota also feels that Congress has a definite obligation to enact proper legislation providing for followup participation by the Federal Government in any and all of the major water development projects. This followup action has been lacking in some of the major water resource programs already completed, to the distinct hardship of the States involved. An example is the situation with regard to Missouri River main stem impoundments, wherein recreation was used by the Federal agencies to sell the program to Congress. South Dakota, for instance, expected Federal development of recreational facilities at Fort Randall and Lewis and Clark Lakes to be carried out on a large scale, consistent with the recreational potentials cited by the Federal Government in justifying the construction of these impoundments. Some limited followup recreational development has occurred, with the result that the State has been handed the responsibility of a development program far beyond the scope of our citizens' financial abilities.

In this connection, research to determine the needs and the potentials of large reservoir recreation and to determine methods of managing the fish and wildlife resources is also beyond the scope of the State government in many instances and should be included as an integral part of the Federal Government's long-range planning for these reservoir projects.

The broad and basic question that confronts our people when viewing all of the Federal water development projects in South Dakota is the question of priority on water use. Much of the development work being carried out now in the State will result in benefits to South

Dakota, but this department places much less priority on the benefits of downstream navigation than it does on those projects which would retain and use this water within the State for such purposes as reservoir subimpoundments for wildlife production, water retention for maintaining water levels in many of our natural and artificial lakes, and even the pumping of stored waters into such bodies as Red Lake, Lake Andes, and others which have high recreational values.

Irrigation projects planned in eastern South Dakota, with the incorporation of a few changes, could have extremely beneficial effects on fish and wildlife populations here and would provide greatly increased recreational facilities for our State. We strongly recommend that Congress authorize and instruct the Bureau of Reclamation to enter into studies with our department in this area and provide for inclusion of recreation, fish and wildlife projects in irrigation plans now being developed.

We also urge your committee to support the U.S. Fish and Wildlife Service's programs of wetlands acquisition and to materially assist that agency's work toward preserving the wet lands of the Prairie States which are so valuable in terms of wildlife production and the maintainance of our all-important water tables.

We also urge the committee to make a special study to determine if more emphasis could be placed on holding the water where it falls and thus preserving most of the precious rainfall that our State depends upon for economic survival. This department feels strongly that too much attention has been paid in the past to stream channel improvement, diking, ditching and the other practices of hastening the water into the river channels. These practices treat the effect, not the cause of our water problems.

Along with water rentention, water production is a critical area in the handling of our water resources. A classic example is in the Black Hills of South Dakota, where below-normal rainfall in recent years coupled with poor watershed management has resulted in reduced streamflow. When this occurs, the recreationist stands with the rancher, the irrigation farmer and all members of the economic community in facing a loss in income, recreation, and the ability to use and enjoy the other natural resources of the watershed.

Overgrazing, road construction, forest and range fires—these are only a few of the contributing causes to watershed deterioration in the Black Hills. Since this is occuring on National, State, and privately owned lands, it behooves us to launch a corrective program of watershed management on a cooperative basis as soon as possible.

One of the more obvious sysmptoms of watershed deterioration in a forested area is the siltation of streams. A vigorous watershed development program in the State's range and farming area is also a means. Wildlife and recreation are products of good land use. Sediment-polluted waters, sheet erosion, and raw gullies are all earmarks of a declining recreation potential.

Recreation, which includes hunting, fishing, boating, camping and tourism, is our State's second largest industry and one which affects each of our citizens in a very real way. New wealth generated by this industry in South Dakota amounts to from $130 to $150 million a year.

In closing, the department of game, fish, and parks wishes to thank the committee for this opportunity to appear and present our views

and to urge the select Senate committee to take such action as is necessary to:

(1) Make possible better liaison and coordination between all State and Federal agencies on all water development projects.

(2) Provide for better research methods and operations to insure planning consistent with the long-range recreational needs of the public.

(3) Establish a high priority on water use programs in South Dakota which will have beneficial effects within this State, consistent with available water supplies.

(4) Incorporate within the planning programs of all Federal agencies provisions requiring State participation and the recognition of recreational values involved.

(5) Adapt present and future water development programs not only along the lines of retaining as much water as possible within the State for domestic uses but for production of water through better watershed management programs.

(6) And as an afterthought, considering the importance of recreation to South Dakota and its visitors from both an economic and esthetic sense, we urge the select Senate committee to carefully weigh the importance of incorporating an access roads program into its overall water development program, to allow the public to more fully realize the recreational values involved in these water projects.

Senator CASE. Thank you, Mr. Woodward, for this statement. It might be of interest to you to know that Senator Kerr and I have discussed at different times the possibility of incorporating a title or section on the subject of recreation in the next rivers and harbors omnibus bill, much as we did the water supply section in the last omnibus bill. It is my personal feeling that some clarification of the lines of responsibility is in order and some evaluation of the recreational aspects of these water development projects. Senator Kerr once made the observation that he thought that we ought to have a definitive finding of how much public value there is to the recreational aspect of projects. It is obvious, I think, to those who have witnessed the recreational use of Lewis and Clark Lake, which in the short period of three seasons has achieved a record of over a million visitors in a single season, that the recreational aspects and values that some of these projects had has not been fully realized at the time the project was authorized nor has adequate provision been made in our planning for the public benefits from a recreational standpoint. So your comments and suggestion there are very much appreciated and will be taken into consideration by the committee.

Are there further comments or questions?

The CHAIRMAN. I would just like to make this comment, Senator.

The development of our water resources is a program which is progressing slowly because of the fact that the interest in it is progressing slowly. There is still a very considerable part of our population that regards water resource development projects as pork barrel projects. The Senator will recall that a few years ago—and I know Senator Hart has been very interested in this because his State has the same interest that the rest of us have—that in the development of water resources, the press in Washington referred to all water resource

development legislation as pork barrel legislation. Washington is located on one of the most beautiful streams in our country and one which has been regarded with great respect and affection by countless millions of Americans. There is now a realization on the part of that same press in Washington as there is on the part of much of its population that, lo and behold, it is faced with an imminent shortage of water. It is likewise faced with what actually I think can be appropriately described as a malignant pollution problem. I do not know any area in the country where there is more raw sewage in close proximity to more people than in Washington, D.C.

Now that same press is sponsoring legislation to provide money, appropriations to make comprehensive surveys of the water resources of the Potomac River watershed and to develop plans for the comprehensive us of it from the municipal and industrial water requirements and navigation and pollution abatement. Lo and behold, they are now seeking to participate in the Federal Government's program of the development of our water resources, the preserving of them from pollution, and the containment of them for the increasing requirements of the urban populations of our country. As that situation develops on a nationwide basis, there will be an increasing realization on the part of the people everywhere of the overwhelming necessity for a greater and larger program rather than a justification for a restriction of the program. The contribution you make is in line with that. The Federal Government will respond as the people everywhere awaken to the realization of today's necessities and tomorrow's requirements, make their will known to their delegations in the Congress, both in the House of Representatives and in the Senate.

The Corps of Engineers' representative here awhile ago said that their contemplation, their handling of the program has been greatly broadened by recent legislation. He indicated that as legislation is added in the future, their viewpoint and their responsibility will be broadened and their official action changed accordingly. I know of no field in which the need is greater for a broader understanding by the people of our increasing need, our broadened need, and our greater opportunities for development of public welfare and problems than in this water field. Certainly the aspect to which you refer is one which has been too little regarded and which has the opportunity as I see it, for enlisting the support of more and more people, whose support will be reflected in action by the Congress.

Mr. WOODWARD. I think, Senator, your comments have some local application, because I am sure our own people don't recognize the full recreational value of all of these projects that are underway at the present time.

The CHAIRMAN. You said that it has developed an industry in South Dakota with an annual expenditure of $130 million to $150 million, I believe.

Mr. WOODWARD. That is right.

The CHAIRMAN. Let me say to you that in my judgment that is but a very limited example of what the future can hold. Today in Oklahoma recreation is third, agriculture first, oil and gas second. There is not the slightest doubt in my mind but what it has possibilities of not only contributing to making both agriculture and our oil industry larger, but also of becoming Oklahoma's greatest in-

dustry, that is, from the standpoint of financial benefit to all the people. Great as is your agricultural production, which is one of the finest in the Nation, I think that recreation can become South Dakota's most beneficial industry from the standpoint of financial income to all the people industrially, and it will not harm agriculture. It will just be the source of a greater demand for a more intensified agriculture in South Dakota.

Mr. WOODWARD. Thank you, Senator.

The CHAIRMAN. Pardon me for spending so much time.

Mr. WOODWARD. We appreciate the fact you have sought recreation here in South Dakota, for coming here and hunting pheasants with Senator Case. I was just a little bit baffled, too, in whether he was referring or making his comments to you or me when he said you had reasonable success in your pheasant-hunting project.

The CHAIRMAN. The statement was accurate and I would say the application broad.

Senator CASE. Thank you very much, Mr. Woodward.

The next witness we have listed is Mrs. Edna S. Johnson, of the League of Women Voters of South Dakota.

While Mrs. Johnson is coming to the witness stand, may I say that the committee is to be the guests of the Lion's Club luncheon at 12:15 here in the hotel. The committee will recess at whatever time is necessary to meet with the Lion's Club but will convene again this afternoon at 1:30 and the witnesses that have not been called this morning will have their opportunity to present their testimony this afternoon before the committee is adjourned.

Mrs. Johnson.

STATEMENT OF MRS. EDNA S. JOHNSON, LEAGUE OF WOMEN VOTERS OF SOUTH DAKOTA

Mrs. JOHNSON. Senator Case and members of the committee, the League of Women Voters of South Dakota is happy to have this opportunity to present to this committee a brief résumé of the major points and questions concerning the Missouri River Basin project that have come to our attention in the nearly 3½ years the subject has been under study by our groups. We wish to leave on file with you a copy of our Missouri River Basin study and a copy of the remarks we will make here today.

The leagues in South Dakota have become aware of the limited authority vested in the Missouri Basin Inter-Agency Committee which has been the coordinating authority in the basin project. This agency has enjoyed only the power to coordinate and suggest, lacking any real power to decide and implement those decisions. Coordinating the needs of all the States in the basin, the multiple purposes of so large a project and the many agencies concerned would seem to require more authority be given to the overall authority, commission, or committee. The Missouri Basin project has already entered into the developmental stage and we wonder if this positive coordinating power is not already overdue.

We note that inequalities in financing seem to exist and would recommend ways to be found to remedy this phase of the program. Due to the fact that the South Dakota League of Women Voters had not

completed a basin study in conjunction with the other States of the basin, we regret that at this time we cannot offer specific recommendations.

We are cognizant of the Senate bill 2549, of which our own Senator Case is a cosponsor. This bill has received the support of the League of Women Voters of the United States since it would set up a council of advisers in the White House and a joint committee in the Congress to give continued informed attention to the needs and capabilities of the Nation in the field of natural resources. We believe, and we hope we are right, that this bill is a step toward coordinating administration at the congressional and executive levels to our natural resources program.

On behalf of the League of Women Voters of South Dakota, I wish to compliment the Senate select committee for studying our country's resources needs and problems. We hope they will produce recommendations that will solve the problems and meet those needs. Public interest and support are almost always necessary and informing the public in one of our aims. Perhaps in this we may work with you.

Thank you.

Senator CASE. Thank you very much, Mrs. Johnson. While you are at the witness stand I should like to call attention to the fact that the South Dakota League of Women Voters in March of this year prepared a brochure headed "Know Your River" basin study, which I assume was used by your several local groups.

Mrs. JOHNSON. That is right.

Senator CASE. And as I have had an opportunity to look at it, it appears to me to be one of the most informative and factually packed statements on the Missouri River Basin program that I have seen. It may be a little long for inclusion in the record but copies of it will be made available to members of the committee and the staff for further study.

Mrs. JOHNSON. Yes. If any more copies are needed, we could provide them.

Senator CASE. Thank you very much.

Senator Kerr tells me that the League of Women Voters and the State farm bureaus have testified at each of the hearings which the committee has thus far held in other States. Half of the hearings have been held in several States already, and the other half are to be held in several other States. I have not attended the other hearings, but it is a significant fact that the women of the country are taking an interest in this water problem as is evidenced by the remarks of Mrs. Johnson here.

The next witness is Mrs. Florence Cady of Mellette, S. Dak., one of our fine civic leaders and herself a person interested in farming and water resources.

We will be pleased to hear from Mrs. Cady at this time.

STATEMENT OF MRS. FLORENCE CADY, MELLETTE, S. DAK.

Mrs. CADY. Senator Kerr, Senator Case, and Senator Hart, I am more than pleased to greet you people here today and to be with you and I am also going to say that I am glad one is a Democrat and the other is a Republican, because this is a nonpolitical issue in talking of irrigation.

Thank you for giving me the privilege of appearing a second time before your committee. I represent the majority of men and women farmowners along the James River opposed to irrigation as proposed by the Bureau of Reclamation, and the huge appropriation of funds for further study.

This year has not been a dry year—less income, and we realize the loss but we do not have a huge Government obligation to meet, nor the possibility of foreclosure. In a Newell paper many foreclosures were listed in an irrigated area. This was a place where irrigation had assured them of plentiful crops—or was the expense greater than the returns?

Anyone who may appear before you in the interests of those pushing irrigation represents a very small minority of farmers in this area compared to those who represent and who definitely wish no part of the irrigation project. You would have heard their sentiment to this effect long ago, had they had any idea that there was any possibility that this project was so near completion or that there was any possibility of it ever being forced upon them in the manner now proposed. We feel that this could be the crucial moment in the history of this whole sorry plan. During the examining and studying processes, and soil-testing procedures, our fields have been crossed and recrossed, yet to date no farmer knows what the future plans are for his particular farm or the cost.

Whenever any mention is made by the Reclamation Bureau of their projects, only its beauty and recreational charms are listed—not a word about the cost to the farmer. By attending and asking questions at these water meetings for years we found the Reclamation Bureau has indefinitely reported an average cost of $7 per acre per year for water. It will take 40 years out of the life of each farmer to pay the inital percentage cost of $981 per acre. These figures were given to us by the representative of the reclamation agency. For 160 acres the farmer would pay 20 percent of $156,960, along with his other expenses.

With the cost of the Reclamation Bureau would be added special farm machinery, $45,000 for caterpillars and $35,000 carryalls, at an operating cost of $20 to $30 per hour. The price for leveling our acres would be based on: (1) the number of yards per acre; (2) distance of the haul; (3) amount of fall per hundred feet; (4) kind of equipment, and (5) extent of contract. I ask you, gentlemen, how many farmers could afford to operate their farms under this terrific handicap.

Our growing season, members of the select committee, is only 3 months, not 12; we do have rainfall, the farmland in our area is of the best in South Dakota. Drought is not our only hazard—we have hail, rust (from too much moisture), cyclonic winds, insects, weeds, and frost. No Government reclamation project could possibly control these situations. Our God-given rainfall averages 20 inches per year—the highest rainfall was in 1953—28.39 inches and it was too much excess moisture to harvest the crop.

An interesting article written for the Reader's Digest by Leslie A. Miller, former Governor of Wyoming and Chairman of the Hoover Committee and Task Group on Reclamation and Water Supply in the May 1955 issue—"Dollars Into Dust" states at this time the re-

ported construction of building per acre for irrigation alone would be $906 which is close to the figure given to me later of $981. The original amount authorized by Congress for the Missouri Basin project was estimated to cost $831 million—it has already jumped to $3,103 million and there has been more in the last 4 years.

I ask you to consider the inconsistency of being paid for putting acres in the soil bank and having wheat alloments to cut down the surplus, and then promoting an irrigation project costing millions to the taxpayer. Millions of acres of productive soil along the James River, the richest farmland in the country, will be lost to cultivation entirely.

Some of those who plead the cause of irrigation are acting at the behest of cities and towns who would use this means to procure power or water for themselves. We hear that in case of low water, human consumption will come first. The statement comes from the Reclamation Bureau—so in this case there would be no water for irrigation. Is it right to victimize the farm element who would be paying the bill to this extent?

Recently I read an article on the horse-and-buggy days when folks believed in balanced budgets—not huge debts for future generations to pay. Through free enterprise man found the value of steam for locomotives and river boats, electricity, the telegraph, electric illumination, telephone, radium, the wireless. All done without Government aid or a single Government aid or a single Government bureau in sight—and a balanced budget.

In appearing here today I not only do so on behalf of all the farmers interested, but I am also appearing as a farmowner. I have lived in the community affected by this proposition for 40 years; I know the results that have been accomplished on this fertile land and without the aid of any irrigation and without any interference by a Reclamation Bureau. From my personal experience in the management and ownership of 960 acres of rich farmland in this area, I believe that the terrific expense of the Reclamation Bureau to bring this water to our farmers would be a tragic mistake. I want to say that regardless of any personal interest that I may have in this project that I am here on behalf of the signers of a protesting petition, which is on file in Washington, D.C., which has been signed by at least 90 percent of the farmers in the area who will be affected financially and otherwise by the installation of this project, the anti-Oahe irrigation group, and not political.

Finally, may I say that someplace this beautiful package or irrigation by the Reclamation has a price tag attached. After 12 years of study they should know the cost and be willing to say to the citizens of South Dakota, "This is the price." To date this has not been done, and every farmer concerned deserves an answer before further appropriations are given. We are asking the real price before it is too late.

May I add this little personal thought, that I have seen many of these farmers who have received food commodities who are now driving Cadillacs, spending winters in Arizona, all without the benefits of irrigation.

I would suggest and I would recommend to this committee it seems that irrigation must come before they can have any help in the towns. I know every town needs water. They need it badly. Why couldn't

this organization pipe it into all the cities, let the farmers do their own irrigating as they would. Personally, and without the expense that would come to them through the irrigating by the Reclamation.

I thank you.

Senator CASE. Mrs. Cady, may I say that I think your final request here is a proper one, that before the farmers should be committed they should be given the price or the price tag, and that is the reason for pushing the completion of the studies that have been underway for some time.

Mrs. CADY. It has only been by going from one water meeting to another that we have kind of assembled these figures. We say, "How much will it be acre" and part of them were found out through the work in California where I was coached on some of those prices that were given there. I believe the machinery is just a little higher now.

Senator CASE. The final study for the Oahe unit, I believe, was to be completed next year.

May I ask whether or not the observations you have been making are related to the so-called big Oahe project of half a million acres or so, or are they made with reference——

Mrs. CADY. It is more about the Jim River. They want their lands left there just as they did. They have been doing very well along there. There are so many that could not possibly do that work of irrigation. Help is almost impossible to get in South Dakota.

Senator CASE. Are your remarks made with specific or direct reference to this small unit suggested as the Lake Byron development?

Mrs. CADY. Not where they would do it themselves. That does not include the Lake Byron. It is just as you say, that they are going to take over the Jim River and those farms for irrigation.

Senator CASE. You are thinking of the so-called large Oahe project and not specifically with reference to the Lake Byron development?

Mrs. CADY. No, I am not. As they would take over this part in Brown and Spink Counties.

Senator CASE. In Brown and Spink Counties?

Mrs. CADY. Yes. This was mostly in Brown. I talked to George Schuyler, head of this and he definitely says they were all—none of them—they don't don't want to do that kind of work. They haven't the help to do it with. That is serious.

Senator CASE. Are there further comments or questions?

Thank you very much, Mrs. Cady.

Mrs. CADY. All right.

Senator CASE. I see it is 7 minutes after 12. There will hardly be time for another witness. I think the committee will recess at this time to reassemble here at 1:30 this afternoon.

(Whereupon, at 12:07 p.m., the hearing was recessed to reconvene at 1:30 p.m. of the same day.)

AFTERNOON SESSION

Senator CASE. Mr. Chairman, before we call on the witnesses this afternoon, I should like to enter for the record a few statements that have been presented for inclusion in the record.

First, I should like to note the presence here of Philip P. Dickinson. He is an assistant to U.S. Senator Clair Engle of the State of

California. Senator Engle is a Member of the Senate very much interested in all water matters and he arranged to have Mr. Dickinson attend these hearings as evidence of his interest. In particular I might mention that Senator Engle is author of the bill, S. 13 which proposes the special Federal program in connection with development of irrigation with which non-Federal, municipal, and industrial projects can be developed.

I also wish to note the presence of Mr. Dale Nelson, secretary-treasurer of the Minnesota Farm Bureau Federation, who was here all forenoon, but who is obliged to catch a plane this noon and has left with me a statement of the Minnesota Farm Bureau Federation on the subject of water conservation.

Without objection that will appear in the record at this point.

(The statement referred to follows:)

STATEMENT BY MR. DALE NELSON, SECRETARY-TREASURER, ON BEHALF OF MINNESOTA FARM BUREAU FEDERATION

My name is Dale Nelson, I am secretary-treasurer of the Minnesota Farm Bureau Federation, a nonprofit corporation organized under the laws of Minnesota, which has more than 31,000 farm families as members. Our members are located in 84 of the 87 counties in Minnesota, so that geographically they cover the entire State.

Minnesota is most fortunate among the States in her water resources endowment. Lake Superior forms a goodly part of our northern area; our northern boundary has Lake of the Woods, Rainy Lake—two very large bodies of fresh water, and the entire chain of lakes running eastward into Lake Superior through which runs the international boundary line between our State and Canada. On the west, we have the Red River of the North forming the boundary between our State and North Dakota and a portion of the boundary between South Dakota and Minnesota. Along our eastern boundary, we have the St. Croix River acting as a boundary between our State and Wisconsin and the Mississippi River completing that boundary from Prescott south (Prescott being at the confluence of the St. Croix and the Mississippi). The headwaters of the Mississippi rise in our State at Itasca Park. The Minnesota River has its headwaters on the South Dakota boundary and flows across our State to join the Mississippi at old Fort Snelling. The Red Lake River, Wild Rice River, Otter, and many other rivers within our State, as tributaries of the major rivers, along with our 10,000 lakes, are proof of our heavy water resources endowment. Nevertheless, we in Minnesota are deeply concerned with the growing attitude on the part of some administrative officials in the Federal Government who are ignoring the basic concept that the States of our Union have authority over the water of rivers and other navigable streams that are located within their borders or which flow through two or more States of our Union. I am not a lawyer, but I am advised that some of the assertions of Federal control over water resources are—

(1) If the water of a stream which is nonnavigable flows into a navigable river or stream, the State loses jurisdiction over the nonconsumptive use;

(2) If water flows from or through lands reserved to the Federal Government and into a nonnavigable river or stream, the State loses jurisdiction of nonconsumptive use of that water;

(3) If a Federal agency desires to use consumptively water on lands which have been reserved or which lie within a prospective reservation, the State loses jurisdiction of such consumptive use;

(4) If water flows from lands which have been reserved to the Federal Government and into an adjoining State or through that State, the latter has no jurisdiction with respect to consumptive use and private rights validly established under the law of that State, after the date of reservation to the Federal Government, can be invalidated if occasion so requires.

Reflection on the application of these tenets to the water resources in Minnesota readily establish our cause for concern.

Because we in Minnesota have had very few water problems, we have been somewhat remiss in not pressing for a proper solution of this nationwide problem

of proper and fair utilization of our waters. We recognize that Wisconsin, to a large degree, has the same bountiful heritage as we possess, but looking to the west we find North Dakota and South Dakota less bountifully provided. With less rainfall in the western portion of these two States than in the eastern portion and even there much less than we receive in the southern part of our State, we feel that we should do all we can to assist our sister States in developing a sound national program for the utilization of our water resources, along with those of the other States in our area. In Minnesota we draw heavily on the grain, cattle, and other products of the farm from both North and South Dakota. Traditionally the economic advancement of those two States has been beneficial to us in Minnesota. In short, what is good for agriculture in North Dakota and South Dakota will be good for agriculture in Minnesota and will be good for business in Minnesota. When business is good in our State, it means that our products and those of our sister States are absorbed in greater quantity and at better prices than when agricultural production and agricultural prices are depressed. It is just as simple as that.

We in Minnesota are not so concerned with the legalistic aspects of this national problem. As we view it, these matters are for the judgment of Congress; not for the exercise of administrative decision by a division or department of the Federal Government. The Congress is vested with vast powers. We have confidence that when Congress is informed of the magnitude of the problem and its importance to agriculture, it will exercise those powers in the ways which will be best for all the people, and that in doing so, Congress will set up standards and safeguards that will recognize and respect the individual rights of all of us who use water and rely upon our water resources for our daily activities.

What kind of a law should we develop which will do these things? It is our sincere belief that whatever law is enacted must provide for the protection of State water laws now or hereafter promulgated to meet local problems and to recognize and respect private rights established under those State laws. Naturally, the law would be applicable to all States of the Union. The following principles should not only be recognized but embodied in any such legislation:

(1) The State government has the authority to regulate the use of water flowing from or through lands which have been reserved to the Federal Government or Federal lands which have been withdrawn;

(2) Every license issued by the Federal Power Commission should embody an express condition requiring the licensee to comply with the laws of the particular State in which the license becomes operative so that the use of water in navigable streams shall be at all times consistent with that State law;

(3) Subject only to the paramount Federal authority over navigable streams that are actually navigable (not merely "navigable" in a legalistic sense), all Federal agencies, departments, and officials exercising the administrative rights on Federal projects should comply with the applicable law and procedures of the particular State or States whose waters are involved for the purpose of obtaining rights to use that water;

(4) If any Federal agency, department, or Federal official takes any action which damages or threatens the rights of any present owner to the use or right of use of water, such agency, department, or Federal official acting on behalf of the Federal Government should endeavor to negotiate the acquisition of such rights by purchase or failing that, then proceed by condemnation to acquire such rights under the principles of due process and payment of just compensation;

(5) Where private rights to water or its use have been validly established under the laws of any State involving the waters of a navigable stream or body of water, any action by the Federal agency, department, or individual acting for the Federal Government would be required to follow the provisions last set forth and either purchase those rights or secure their termination or right of use by condemnation under due process and with payment of just compensation.

Throughout any consideration of this problem of legislation for water, particularly as it involves the question of a "navigable stream," it is our belief that it is much more desirable for Congress on the basis of established authorities within the particular States (and not looking only to the decisions of the Supreme Court of the United States) to determine, decide, and define what constitutes "navigability" for the application of the basic concept that Federal authority is dominant with respect to navigable streams. Nevertheless, along with that definition and determination should be developed and written into

the law the correlative principle long recognized in the law of waters of some of the more westerly States of an equitable apportionment of such waters as do fall within the ambit of Federal authority. Moreover, extreme care should be exercised that the preemptive rights and prerogatives of the several States of the Union to recognize and protect the rights and interests of the States and their citizens in determining the development of watersheds and rivers lying within its borders and how this available water should be used must at all times be respected. This may require a rejection or revision of the views of some persons high in Government office on what the rights and prerogatives of the Federal Government are, but it is our considered judgment and we submit it as a basic proposition to your committee, that the welfare of the people of the States comprising the United States of America at all times must transcend and rise above the personal opinions of administrative officials and, if need be, judges, whose views and opinions should and must reflect at all times the changing needs of our people and the demands of their daily activities; yet withal recognizing that as a nation of sovereign States we each bear toward our neighbors an obligation and responsibility to use all available water supplies in a way that is fair and equitable and which will achieve the greatest good for the greatest number. This is not too much to ask of the Congress because as the representatives of the people who elect them, our Senators and Congressmen should consider carefully the needs from not only their constituents but the country as a nation, and proceed from that standpoint rather than from the localized or selfish interests of their particular constituents. This may not be good politics but certainly it is good statesmanship, which on the occasion of legislation involving the water resources of our Nation should be the controlling principle by which every Senator and Representative should be motivated and guided in his action and his vote for this needed legislation.

I thank you personally, and on behalf of my organization, for this opportunity to appear before your subcommittee and to give you this expression of our organization of farmers. I trust that you will be ever mindful of the heavy responsibility that we place in your hands in pressing for legislation which will have so important an impact on the very generous endowent of water resources that we in Minnesota now enjoy. We in Minnesota Farm Bureau Federation stand ready to do our full share to carry forward a program that will embody the principles which we have set forth above and which will carry them forward to fruition for not only we in Farm Bureau, but for all the citizens of our State and of the adjoining States which look to us for aid and cooperation in solving this mutual problem.

Senator CASE. We also have a statement submitted by the Pierre, S. Dak., Chamber of Commerce on the subject of water use. It was presented by Mr. Curtis B. Mateer, chairman, and without objection that will be placed in the record at this point.

(The statement referred to follows:)

STATEMENT BY CURTIS B. MATEER, CHAIRMAN, CHAMBER OF COMMERCE, PIERRE, S. DAK.

This statement is submitted on behalf of the natural resources committee of the Pierre, S. Dak., Chamber of Commerce, in response to an invitation to submit opinions with respect to possible future legislation by the Congress on water projects.

It is the opinion of the Pierre Chamber of Commerce committee that the largest single water resource available to the people of South Dakota is the water of the Missouri River, impounded and to be impounded in the reservoirs now built or under construction.

It is our opinion that the best use that the people of South Dakota can make of this water, when it becomes available to them, is for irrigation of a sufficient acreage of land to assure the livestock industry of this State with a reliable feed base, and to permit a shift from the present marginal and hazardous production of wheat to production of feed and vegetable crops of higher value, which are not in surplus supply.

To this end we recommend that congressional action be taken to hasten the date when water impounded in the Oahe Reservoir can be used for this purpose. We particularly recommend that water be made available to the Missouri slope lands in Sully County as early as possible. Sully County is now an important

wheat planting county in South Dakota, and it is a county frequently visited by drought and hail, with disastrous effects on the economy based on wheat. It is an important stock raising county, and is centrally located in an important livestock raising area. Feedstuffs grown under irrigation, on land now devoted to wheat growing, would all find an immediate market in the adjacent area.

Our committee also considers navigation is a benefit which the people of South Dakota could and should enjoy as result of the comprehensive program of development of the water resources of the Missouri River Valley. The impoundment of water in the large reservoirs in this State results in the creation of slack water pools of navigable depth stretching entirely across the State. The existing waterway in process of completion from St. Louis to Sioux City will bring navigation to the southeast corner of South Dakota. We recommend action by the Congress to connect this waterway with the chain of lakes through the authorization of locks around the Gavins Point, Fort Randall, and Big Bend Dams prior to the year 1970, and the authorization of a lock system around the Oahe Dam to be built as soon as the downstream locks are completed.

Senator CASE. This morning the members of the South Dakota Agricultural Stabilization and Conservation Committee were in attendance. They were not able to be here for all of the afternoon session. They have left a statement prepared by Carl J. Schaefer, the chairman. Others present were Olaf J. Jacobson, the administrative officer, Andrew D. Brakke, and Merl Grupe, members of the State ASC committee.

(The statement referred to follows:)

STATEMENT BY THE SOUTH DAKOTA AGRICULTURAL STABILIZATION AND CONSERVATION COMMITTEE

Water conservation is a matter of primary concern in South Dakota for many reasons, a principal one being our dependence on the livestock industry. Ever since this State was first settled, back in the early sixties of the 19th century, there has been a chronic shortage of water. This chronic situation becomes acute at times, the present year 1959 being one of the most serious of those times. Long-continued lack of precipitation during the fall and winter of 1958 and during the spring and summer of 1959 has caused the situation to become critical in many parts of the State, especially in the range areas. A survey made late in April of this year revealed that of the 56,315 livestock dams and dugouts constructed under the ASC conservation program and still in serviceable condition, 26,944 were dry or nearly so. This means that 47.8 percent, or nearly half of the major stock water facilities in the State were rendered temporarily useless. Since we must depend quite heavily on spring runoff to fill our dams it

The construction of additional dams, of course, continues to be a major part of the long-range solution to this problem and this program has been pushed vigorously this year. In fact, although the work is incomplete at the present time, it now appears that a total of more than 5,000 new structures will have been completed by December 31, 1959. However, realizing that a more immediate solution was needed, the State ASC committee declared, on May 22, 1959, that ACP cost-share approvals for range wells should be given priority in the counties where most urgently needed. All county ASC committees were notified accordingly and they acted promptly to comply with the State committee's directive. In establishing their policy the State committee pointed out that a range well should not be approved to serve a pasture which already is equipped with dams, dugouts, or other facilities that normally could be expected to furnish adequate stock water except in cases where the county committee determines that a real emergency exists.

As a result of the State committee's policy it appears that more than 1,500 range wells will have been constructed on South Dakota's farms and ranches under the 1959 ACP by the close of the year. Many of these are artesian wells, necessarily running quite high in total cost, sometimes as high as $5,000 or more. However, the maximum ACP cost-share payment to any single applicant in South Dakota is $1,500 except in the case of pooling agreements. A pooling agreement is an arrangement whereby two or more farmers can pool their resources to develop a conservation project that will benefit all of the farms involved in the agreement. This procedure has been put to excellent use in the

construction of range wells serving two or more pastures. Also, we can authorize cost-sharing for amounts up to $10,000 in cases where a pooling agreement is in force. Much good has been accomplished through this program and we plan to develop it further in the future.

With the pressure of requests for emergency stock water development showing no signs of diminishing, together with the necessity for giving equitable consideration to requests by farmers for cost-sharing on numerous other good conservation practices such as grass and legume seedings, terracing, tree planting, sod waterways, and erosion prevention practices, the limited resources of the ACP and soil bank programs have been strained to the utmost. In fact, it became necessary on July 20, 1959, to authorize the commencement of concurrent operations using 1960 program funds and there are now 46 counties in South Dakota operating on that basis. Tentative obligations against the 1960 program year budget already total more than $700,000 and new requests for cost-sharing are being received every day. With reports of calves dying from the stagnant water in many stock dams, the county committees are understandably anxious to do everything possible to alleviate the situation.

Another problem directly related to water conservation in our State is the problem of wild wells. Although this particular problem is not the administrative concern of ASC, it is important to us because it does have a direct bearing on the conservation of what water we have. For example, it has been reliably reported that there are 80 wild wells under the Fort Randall Reservoir, some of them running up to 4,000 gallons of water per minute. Unless something substantial is done in the way of corrective action, and done soon, this enormous wastage of water will make our present shortage considerably more serious even than it is now.

ASC is vitally interested in the watershed development work being done under statutory authority by other agencies of the Government. Many practices carried out by private persons in these areas with the aid of cost-sharing under ACP and conservation reserve are making an extremely important contribution to watershed work. This fact is submitted for the information of the Congress, since it is not commonly recognized that this contribution is an essential part of watershed operations.

This report has been prepared for consideration by the Select Committee on National Water Resources pursuant to Senator Case's suggestion. If further information is desired we shall be glad to furnish it to the best of our ability.

Senator CASE. We also have a statement for the record submitted by the Lower Crow Creek Valley Association prepared by John M. Sieh, the chairman, and representatives with him were Frank Jensen and Don Henley.

For the purpose of conserving time they suggested that their statement be incorporated in the record. And I have extra copies of it so that copies will be available for members of the committee.

(The statement referred to follows:)

STATEMENT OF LOWER CROW CREEK VALLEY ASSOCIATION

Gentlemen, We are a group of farmers living on the lower portion of the Crow Creek drainage system. We have been organized for a number of years for the principal purpose of protecting our land from overflow of the James River as well as the runoff of the upper Crow Creek watershed. Our organization has spent a considerable amount of money building levies and drains to protect our land from the recurrent floods.

We feel that it would be an asset to our locality to develop a total watershed program for Crow Creek. We know that the cost of our present private improvements was justified; we don't see why the cost of a properly planned watershed program should not be justified. We believe that the present proposed plan of development for a Crow Creek watershed program through the cooperation of the U.S. Soil Conservation Service could coincide basically with our present improvements.

In addition, our group believes that regional channel improvement of the James River would not only contribute to the success of the Crow Creek watershed development but that its cost could be justified in its own right. We believe that it is a much more sensible public policy that floods be controlled in the

areas where they start rather than attempting to deal with a flood problem in the mainstream channels.

Our organization feels most emphatically, that it is not to our community and national interest that productive agricultural land be turned into wildlife and refuge areas.

Thank you for your courtesy in giving our organization the opportunity to express our position concerning our local water problems.

Senator CASE. During the forenoon we also had the privilege of having present Mr. Ross Cumming, the State master of the South Dakota State Grange. Mr. Cumming prepared a statement on water use in which he urged completion of the feasibility on the James River irrigation project, and, second the consideration of the proposed slack water system for the Missouri River in order to make more water available for irrigation and other uses.

Without objection that statement will be placed in the record at this point and copies handed to the members of the committee for their personal reference and reading.

(The statement referred to follows:)

STATEMENT OF THE SOUTH DAKOTA STATE GRANGE BY ROSS CUMMING, STATE MASTER

Gentlemen, the South Dakota State Grange deems it a privilege to express our views on water resources.

Wise conservation use and development of water resources has become America's No. 1 resource problem. We believe that the water resources of the Nation should be developed for the greatest good of all interests, both public and private. The priority of use for agricultural purposes should be held inviolate and all other established priority of uses of water should be preserved.

There are three areas of development that we feel should be of interest to South Dakota. With the completion of the large dams on the Missouri River in the foreseeable future, the best use of the water should be planned.

1. The completion on the study on feasibility of the James River irrigation project—to take into account not only irrigation, but also the recharging of the aquifer in the area. With the drilling of irrigation wells, our water table is lowering. As this area is a highly developed agricultural part of the State, if water was available, industry would develop also.

2. It is our feeling that present system of maintaining a navigation channel downstream on the Missouri River is a tremendous waste of water. Much more beneficial use of the water would be possible if the slack water system was built below the large dams. Much more water would be available for irrigation and other uses, and would be able to produce more electricity at the present dams, besides being able to generate electricity at the smaller dams down river.

3. We would urge the Federal Government, State governments, and local agencies to utilize every effort to make efficient soil and water conservation programs under the Small Watershed Act (Public Law 566). And would recommend an amendment by the Congress of the Watershed Act (Public Law 566) by removing the limitation of 5,000 acre-feet for floodwater detention capacity, thereby permitting within the total maximum capacity of 25,000 acre-feet allowed under the act that combination of flood detention and water storage for all purposes which will provide the maximum beneficial development of the available damsite.

Senator CASE. Mr. Leslie Towles, the superintendent of Pine Ridge Sioux Indian Tribe is present and his presence should be noted. He is representing not merely the Indian agency but the Oglala Sioux Tribal Council. The Oglala Sioux Tribal Council has adopted some resolutions dealing with development of irrigation from the existing Oglala Dam and the proposed irrigation on the upper White River. Those resolutions will be incorporated in the record when submitted by the tribal council.

We have also a statement by the Rosebud agency of the Rosebud Tribe entitled "Critical Needs for Water Resource Development, Rosebud Indian Reservation, S. Dak." Copies are available for each member of the committee as well as for the staff study. That statement will be incorporated in the record.

(The statement referred to follows:)

STATEMENT BY BUREAU OF INDIAN AFFAIRS ROSEBUD AGENCY, SOUTH DAKOTA, IN BEHALF OF THE ROSEBUD SIOUX TRIBE

The Rosebud Indian Reservation lies in the southern part of the State of South Dakota, and includes portions of Mellette, Tripp, Gregory, Charles Mix, Todd, and Lyman Counties. The Nebraska-South Dakota State line forms the southern boundary of the reservation, the Missouri River the eastern boundary, and the White River forms the northern boundary. The Pine Ridge Reservation lies adjacent to the west.

The Yankton Sioux subagency office, in Charles Mix County, is also under the jurisdiction of the Rosebud Reservation.

The economy of this portion of South Dakota is largely dependent upon the farming of small grain crops and the raising of livestock. Like most reservations in this area the rural population is greater than the available resources can support. There is very little available potable water for the use of the people living in the isolated portions of this reservation. Their allotments of land may lie a considerable distance from small towns or developed sources of water.

We also find that we are unable to make the most efficient use of one of the valuable range resources of this reservation due to the lack of livestock watering facilities. Although many of the Indian residents are interested in developing range beef herds of their own they are confronted with the problem of financing water developments for their cattle.

If the resources available within the Rosebud Reservation are to support even a portion of the present population in an acceptable standard of living, steps must be taken to see that the resources of water are properly developed to insure their most efficient use.

We estimate the water resource development needs for the Rosebud Indian Reservation to include the development of wells, stock watering reservoirs, and irrigation. Adequate funds should be made available to develop recreational facilities in conjunction with any reservoir construction program.

WELLS

300 shallow wells and 100 deep wells.

STOCK WATERING RESERVOIRS

300 reservoirs at a cost of not more than $1,500 each.

IRRIGATION

Keya Paha drainage:
- 2,740 acres potential; 7,100 acre-feet annual water needed.
- Source: Keya Paha River.
- Location: Scattered tracts along Antelope Creek and Keya Paha River in Todd and Tripp Counties. River structures would have to be constructed and maintained to insure an adequate supply of water for July and August; low head pumping installations with gravity flow.

Ponca Creek drainage:
- 940 acres potential; 2,500 acre-feet annual water needed.
- Source: Ponac Creek. Water supply presently inadequate for that many acres. Reservoirs would be needed to furnish ample water for critical periods.
- Location: Gregory County.

Two Kettle project:
- 298 acres; 780 acre-feet annual water needed.
- Source: Little White River; gravity flow by diversion.
- Location: Mellette County.

Little White River and drainage:
3,000–5,000 acres potential; 13,000 acre-feet annual water needed.
Source: Little White River.
Location: Scattered tracts along river in Todd and Mellette Counties; irrigated by low head pump lifts with gravity flow or sprinkler irrigation.
Scattered tracts:
Possibly another 10,000 to 15,000 acres in scattered tracts in Todd, Mellette, and Tripp Counties; 39,000 acre-feet annual water needed.
Source: Ground water if available in ample quantity.
Missouri River bottomlands:
500–1,000 acres potential; 2,600 acre-feet annual water needed.
Source: Missouri River; low to medium head pumping stations with gravity flow system.
Location: Scattered tracts along Missouri River in Charles Mix County, Yankton Reservation.

Senator CASE. Among those present are Ulrich Gwynn, Jr., manager of the Aberdeen Chamber of Commerce, and O. G. Claflin, member of the irrigation committee for the agriculture section of the Aberdeen Chamber of Commerce. Mr. Gwynn asked me to say that they urge early completion of the report on the Oahe irrigation project and their group believes that this should include wordings in the authorization or any planning that would provide for municipal use of the waters from the Oahe diversion project.

Among others present are Harry Martens of Wessington, representing the South Dakota State Soil Conservation Committee. He is filing a statement that will be incorporated in the record.

(The statement referred to follows:)

STATEMENT BY HARRY H. MARTENS, CHAIRMAN, SOUTH DAKOTA STATE SOIL CONSERVATION COMMITTEE

I am Harry H. Martens, Wessington, S. Dak. I have lived and farmed in Beadle County, S. Dak., for the past 50 years. I serve as chairman, State Soil Conservation Committee in South Dakota. I am president of the South Dakota Reclamation Association, and chairman of the Beadle County Soil Conservation District.

The South Dakota Soil Conservation Committee is charged by State law, section 4.1501, "Policy and Scope of the Chapter," to further the conservations, development, utilization, and disposal of water, control floods, prevent impairment of dams and reservoirs, and assist in maintaining the navigability of rivers and harbors.

The western three-fourths of South Dakota are classed as a semiarid area with limited rainfall, for water production and soil moisture conditions, provides a need for the development of water resources where and whenever available without limit of quantity for livestock and crop production.

Water resources needed for livestock production: That part of South Dakota west of the Missouri River is faced with a continual need for the development of water resources for livestock. Ground water supplies are very limited creating a need for dams and reservoirs to store runoff water from snow and rain.

1. The quantity of water development needed: Every possibility of water storage is needed to provide a carryover of livestock water for the long periods of drought that prevails in the western half of South Dakota.
2. The development is needed now and at all times.
3. The total area west of the Missouri River and 12 counties east of the river.
4. The pattern of development should be to place water retaining structures wherever possible, to hold peak flows of runoff, and result in stabilization of streamflow.
5. Justification of expenditures in this field can be limited only to the fact that water is the limiting factor to the total economy of this area.

Streams heading in the Black Hills disappear into sinks by the time they reach the open country. There is immediate need for a project to seal the sinks and provide a flow of water for streams that are dry 80 percent of the time, providing

water for livestock. These streams would also supply a limited amount of irrigation for supplemental feed.

IRRIGATION: WEST OF THE MISSOURI RIVER IN SOUTH DAKOTA

There is urgent need for development of storage structures to retain peak flows of water from snow and rain, and released in an orderly manner for supplemental irrigation water. The greatest need for this type of development is in the drainage area for the Belle Fourche irrigation project. Insufficient supply of water for this project seriously affects the economy of the project and production of supplemental feed for livestock in the area surrounding the Belle Fourche irrigation project.

EAST OF THE MISSOURI RIVER

Development of irrigation, from the main stem dams on the Missouri River, would benefit the supplies of ground water and stabilize the flow of the James River and its tributaries. Cities and towns, in this area, are faced with a serious shortage of water that would be alleviated by a continuous flow of the James River and its tributaries. Irrigation of farmland in the area would stabilize the economy of agriculture.

The limits of expenditures justified in development of water resources for South Dakota should be based upon use of water, immediate needs, and the financial benefits to be derived by each area.

Water conservation is a primary factor in the program of South Dakota's 68 locally governed soil and water conservation districts. The objective of these districts is to keep each drop of water where it falls for crop production, domestic use, flood prevention, and irrigation. To carry out this objective, soil and water conservation districts encourage farmers and ranchers to develop a soil and water conservation farm plan and carry this plan to completion, organize and assist in developing watershed and flood prevention districts, promote and encourage the use of agricultural conservation programs and Great Plains conservation programs. All of these programs plan the conservation and wise use of water.

The progress of conservation and development of our national water resources by soil conservation districts depends upon a closer ratio of Federal expenditures between upstream watershed protection programs and downstream flood prevention. At the present time, Federal expenditures for upstream watershed protection is 1 dollar for every 25 dollars spent on downstream flood control. Equalization of expenditures between upstream watershed protection and downstream flood control, with emphasis on the upstream watershed protection, would be justified to develop and protect the future water resources of South Dakota and the Nation.

Senator CASE. Among those present also are Earl Baxter and Roy Kinder of Onida, S. Dak. Others present at the hearing include Edward B. Johnson, with the South Dakota Department of Game, Fish, and Parks at Pierre, S. Dak., and Willis Engle, president of the Huron Chamber of Commerce. There are also present Lawrence Sees of Irene, S. Dak., William Rames of Menno, S. Dak., and Herbert Reich, representing the James River Flood Control Association.

Now, if it should be that there are others present who do not have statements or whose presence should be recorded, if they will let some of the members of the staff who are seated here at the table at my left know, their presence can be noted.

I wish it were possible that we might have the names of all those present. We have a very good attendance, both this morning and this afternoon. I am sure it is one of the best-attended hearings that the committee will be conducting.

So, those of you who have some statements to submit and have them ready, if you will either advise the committee or send it to my

office in the St. Charles Hotel at Pierre, S. Dak., we will see that it gets into the record.

Is Mr. Fitzgerald present, the State secretary of agriculture?

Mr. Fitzgerald, we will be pleased to hear from you now if you are ready.

The CHAIRMAN. Senator Case, I wish to address a question to the Corps of Engineers while they are here. I noticed in the statement from the grange indications of feeling that much more beneficial use of the water would be possible if the slack water system were built below the large dam. That is for navigation. In view of the fact that we have heard so much testimony in a number of States addressed to the advocacy of that method of maintaining navigable waters in the Missouri, I wonder if the corps has conducted a study on the feasibility of such an operation and if they have made a report on it to the Congress heretofore, or, if they have it, that they could submit it to this committee?

Colonel HAMMOND. I will answer that the best I can, sir. Take the second part of it first, the study is just now getting started as a result of a resolution introduced in the last Congress as to the effects, the cost and benefits and all the other things that would be involved under present conditions. We have estimated that it would take a period of 4 to 5 years to conduct that study so we are really not in position now to give any figures as to what the results would be or even whether it would be feasible or not. There was a previous study conducted in the 1930's—I don't remember the exact year of the final report under different conditions than would exist now, of course, because that was prior to the Missouri Basin development program, much of which has already been constructed, and a great deal of which remains to be done. But to answer your question, no firm information is now available because the study is just, well, it isn't really underway yet, because we have just started to get started, so to speak, and there is no firm information available, as to what the water savings would be, what would you have to do in the way of physical structures and cost incurred, and so forth, to make that saving or even what the effect on other water uses such as power would be.

So we are probably several years away from a really firm answer as to whether or not it is feasible and if it is feasible, what sort of things you would have to do to achieve it.

The CHAIRMAN. Is there such a plan in operation anywhere in the country now?

Colonel HAMMOND. I believe nothing quite as comprehensive as this, Senator. There is slack water navigation on the upper Mississippi. But I do not believe it is directly comparable to this situation.

The CHAIRMAN. In other words, then, it is a matter which the corps is at this time engaged in studying and with reference to which the Congress will be advised as information is developed and conclusions tentatively reached?

Colonel HAMMOND. That is correct; yes, sir.

The CHAIRMAN. That is fine.

Colonel HAMMOND. Yes, sir.

The CHAIRMAN. Thank you very much.

Senator CASE. Mr. Chairman, it is my understanding that the House Committee on Public Works has adopted the resolution requesting this study and under that the corps will proceed.

Before Mr. Fitzgerald starts, one other representative present is Mr. Chalner R. Meyer, area general engineer for the Bureau of Indian Affairs. He is here today as a personal representative of Ben Rifel, the area engineer at the Aberdeen area office.

Mr. Rifel has been vitally interested in water resource development in South Dakota and is a graduate of South Dakota State College and a member of one of the Sioux Tribes of South Dakota himself, and has exhibited a personal interest in water resource development, especially for those areas of Indian lands. It is a pleasure to have his interest here in the presence of Mr. Meyer as his personal representative.

Also present are Mr. Carl Cronin, of Gettysburg, a member of the South Dakota Water Resources Commission, which commission was represented by Mr. Grimes in the presentation this morning.

Also present is Mr. Fred Bartels, of Gettysburg, a member of the State senate of South Dakota and a member of committees in the State senate dealing with water conservation and utilization.

If there are no other notations to be made at this time, we will proceed with the statement by Mr. Ray Fitzgerald, the State secretary of agriculture.

STATEMENT OF RAY FITZGERALD, SECRETARY OF SOUTH DAKOTA DEPARTMENT OF AGRICULTURE

Mr. FITZGERALD. Thank you, Senator Kerr, Senator Case and Senator Hart. The major portion of the research done by the department of agriculture for this hearing has been done in collaboration with other agencies of the State government and is included in their reports.

This will be only, therefore, a brief sketch.

I am Ray Fitzgerald, secretary of South Dakota Department of Agriculture.

It is estimated that 90 percent of the wealth produced annually in South Dakota is based on our farming enterprises. Therefore, anything which will improve the position of our farming in South Dakota will most likely benefit all our citizens.

My experience as a farmer convinces me that the second greatest need of agriculture in South Dakota is development of a more adequate supply of available water.

Great portions of our State has a soil capable of high production, but we are annually handicapped by a lack of rainfall. Precipitation varies in the State from 12 to 30 inches annually, and is distributed during the growing season in such a way that many farming areas of the State suffer a partial or complete failure of either the small grain or corn crop each year.

At the present time the water used in the State is obtained from surface and ground water sources. Shallow ground water is found throughout the State, but adequate supplies are lacking in many areas, especially in the west-central portion of the State. Over 80 percent of wells in existence are of the shallow well type and have a limited

supply available, mostly sufficient for other than irrigation purposes. Certain areas in the eastern portion of the State have deposits where large flows of water may be obtained and these deposits supply water for most of our present irrigation wells, almost all of which have been drilled in the last 6 years.

A large part of the western three-fourths of the State has available deep artesian water, most of which is unsuited for irrigation purposes due to poor quality and small flows. The only major surface water supply in the State, of sufficient quantity and dependability for irrigation purposes, is the Missouri River. There are other major streams in the State, but they are unreliable for any extended period. This fact has been amply demonstrated again during the drought of 1950, when most of the streams contained little or no water after the middle of the summer.

Of all the water currently being used in South Dakota, over 70 percent is used in farming. Livestock and irrigation use most of this water. Presently 140,000 acres of land in South Dakota are under irrigation. About 60 percent of this irrigated land is located in organized districts in western South Dakota, with private pump irrigation accounting for the rest.

The need for stability and diversification in our agricultural production is obvious and there is every indication that a more adequate water availability will help to supply these needs. Although there are a variety of ways in which a greater supply of water may be made available to our agriculture, proper development of the Missouri River is undoubtedly our brightest hope.

Thank you.

Senator CASE. Thank you, Mr. Fitzgerald. We appreciate the statement from you with your responsibility for the development and welfare of agriculture throughout the State of South Dakota.

Are there comments or questions?

Senator CASE. The next on our witness list is Mr. Stanley Johnson, who is the president of the State Association of Soil Conservation Districts.

STATEMENT OF STANLEY JOHNSON, PRESIDENT, STATE ASSOCIATION OF SOIL CONSERVATION DISTRICTS

Mr. JOHNSON. Senator Kerr, Senator Case, Senator Hart, it is certainly a privilege to have the opportunity on behalf of the State Association of Soil Conservation Districts to make this presentation at this time.

I am Stanley Johnson, a farmer in Davison County, S. Dak., near Mitchell. Today, as president of the South Dakota Association of Soil Conservation Districts, I represent 68 soil conservation districts and their 340 supervisors, in addition to their assistants. I speak from experience as a conservation farmer and as a member of my local Davison County Soil Conservation District Board of Supervisors.

Our testimony before this select Senate committee will center around some of the problems that are of primary concern to the soil conservation districts of South Dakota. In regard to small watersheds, this testimony will be presented by our small watershed committee at the

hearing in Sioux Falls tomorrow. Most of the work to date on watershed protection and flood prevention is in the eastern part of our State.

The economic, well-being of South Dakota is primarily dependent on the effective utilization of the limited precipitation we receive. For instance, this Huron vicinity where we are today with about 17 inches of annual precipitation is typical of the example pointed out by research from the Agricultural Research Service in the Great Plains:

Research by ARS in Great Plains (17-inch rainfall)

	Inches
31.3 percent lost an ineffective showers	5.20
34.5 percent lost by evaporation	5.90
13.5 percent lost as runoff	2.40
2.7 percent lost through tillage	.50
18 percent available to crops	3.00
Total	17.00

Therefore, by saving 1 inch of runoff with conservation practices such as terracing, contour farming, crop residue management, and conservation crop rotations, we can increase the amount of water available to crops by about 33 percent in this area.

A 33-percent increase in conservation of moisture for crops will provide greater crop yields and stabilization of farm income in the Great Plains.

We are naturally concerned with conservation that applies directly to the farms and ranches. We feel the Federal, State, and local governments have a responsibility of assisting the local citizen in carrying out his responsibility of soil and water conservation.

We approve of the method by which this is being done at the present time. It is democratic and on a grossroots level. I refer to the soil conservation districts' program as now being assisted by these related activities: small watershed program, Great Plains conservation program, education, research, cost-sharing, credit and technical help.

We feel the expansion of the following items should be given a priority:

(1) Stepping up the securing of and interpreting of data on water resources:

(*a*) Amount of precipiation (more localized).
(*b*) Ground water potential and availability.
(*c*) Streamflow characteristics.
(*d*) Quality of water.
(*e*) Soil surveys and relation to water.

(2) Research in the following areas:

(*a*) Economics of water development and utilization.
(*b*) Vegetation on watersheds.
(*c*) Mechanical practices to conserve and utilize water more effectively.

(3) Educational programs: (*a*) Making available to individual and groups of citizens information on the importance and means of soil and water conservation.

(4) Technical assistance: (*a*) Assistance to the citizens in planning, developing, and installing sound conservation practices of soil and water.

(5) Financial assistance, both credit and cost-sharing for developments that benefit others beyond the individual's land.

(6) Evaluation of completed work to improve methods of conservation, development, utilization, and disposal of water.

Here are some specific problems that we would like to call to your attention:

(1) There is a large area in South Dakota that is known as pothole country, which we feel should receive some specific assistance in developing areas for storage of water. This would improve wildlife habitat and allow making more efficient use of the water where it falls. The farmers and ranchers who own this land should be compensated when they leave it as potholes because one of the incentives that comes about to drain and to destroy these habitats and potholes is the fact if they will produce something they are going to take care of it and put them into production because they are paying taxes and we have to realize the fact that that man on the land has that privilege and that opportunity.

Unless he is compensated, I see little chance that much else can be done.

(2) In parts of South Dakota uncontrolled artesian wells are depleting underground water reserves. These should be brought under control.

(3) Poor quality water is a problem throughout several sections of the State. We endorse studies to improve water quality for all uses.

(4) Small watershed problem areas need special attention. Whenever local communities are ready to solve their flood and erosion problems they should be encouraged to go ahead as fast as possible through organized watersheds.

(5) Dependable livestock water supplies are needed on our farms and ranches.

(6) Waterspreading and small project irrigation works are important and should be accelerated.

We feel that there should be adequate funds available over the years so when the man on the farm or ranch is ready to establish these soil and water conservation practices on his place, he can do so. A good example is the Great Plains conservation program and there are others. I might add a line there, that at the present time the watershed program and the Great Plains conservation program finds stagnation because of lack of appropriations.

We would like to point out the conservation of runoff water is less expensive than other means of water storage. For example, we estimate that the approximate storage costs by these conservation practices are as follows:

	Per acre-foot to store water
Contour farming	$21
Contour furrowing	24
Terracing	61

Watershed detention dams, $35 to $130.

One of the important things about this is that the storage reservoir by conservation practices is also restored to its original capacity within a few hours, or days for dams, after runoff occurs.

Reduction of runoff by these conservation practices that store water also does the following:

Reduces sedimentation of small ponds and reservoirs.

Reduces deterioration of stream channels or waterways.

Reduces sedimentation of large on-stream reservoirs and prolongs their life and usefulness.

Reduces the maintenance of road grades, road structures, stream channels, railroad grades and bridges, water supply reservoirs, stock-water ponds, and levees on main streams.

Reduces the size of road or railroad structures or other downstream structures.

The soil is the most economical and efficient reservoir for storing water.

The future of South Dakota; the "Land of Infinite Variety," is unlimited providing we make wise and efficient use of its soil and water resources.

We appreciate the concern of the Congress of the United States to hold these hearings at the grassroots level. We hope in some small part the testimony you receive in this State will help our Nation better develop and utilize the very important resource, water.

Senator CASE. Mr. Johnson, that is an excellent statement. We appreciate the specific way in which you addressed yourself to the problem and to giving individual and specific suggestions.

Are there other comments or questions?

Senator CASE. The next one on the witness list is Mr. Isaac H. Chase, Rapid City, representing the Forest Advisory Council, the Black Hills Forest.

STATEMENT OF ISAAC H. CHASE, FOREST ADVISORY COUNCIL, BLACK HILLS FOREST, U.S. FOREST SERVICE

Mr. CHASE. Are you short of time? Would you prefer that I just turn this in?

Senator CASE. We only have one or two more.

Mr. CHASE. OK.

I wish to thank the Senators and say that I think your hearings are an excellent idea. I wish you would come out in the Black Hills.

The CHAIRMAN. Do you have pheasants out there?

Mr. CHASE. What?

The CHAIRMAN. Pheasant.

Mr. CHASE. Deer, deer hunting.

My name is Isaac Chase. I am a resident of Rapid City, S. Dak. I am an alderman in the local city government and for 10 years I have represented water users in the Black Hills on the Forest Advisory Council of the U.S. Government Forest Service of the Black Hills National Forest in western South Dakota.

I wish to testify today on the need for extensive thinning of trees in the Black Hills in order to increase the streamflow of Black Hills streams as well as for the economic gain of the U.S. Government.

In the Black Hills Forest there are about 180,000 acres of land where the original stand of timber was cut over before the establishment of the Forest Service or from 70 to 85 years ago.

On this 180,000 acres there are from three to four thousand trees to the acre that average about 3 inches in diameter breast high and are about 80 years old. The minimum size for post, pole, or pulpwood is

6 inches in diameter breast high. These trees if left alone by natural selection might attain that size in another 100 years or longer.

The work of the Civilian Conservation Corps in the 1930's has demonstrated that if the number of these trees per acre is reduced from 4,000 to 6,000 down to three or four hundred per acre they will be commercial post or pulpwood in 20 years. Then the thinning for ultimate sawtimber is done by commercial sales. Twenty-five thousand cords were sold this way last year from Civilian Conservation Corps and other thinning.

As to water. There have been accurate records of the streamflow of Rapid Creek from 1915 to date. The record shows that with the same average annual precipitation in 10 year periods, the streamflow of Rapid Creek has been continually declining. The city of Rapid City and the Bureau of Reclamation have built two dams on this stream to help maintain the stream for water users.

The Rocky Mountain Forest and Range Experiment Station located on the school of mines campus, for which funds are voted by the Congress, has been working on the possible causes of the drop in streamflows.

While they have not studied the problem long enough to make an official report it is my belief that they have shown clearly that there is little or no contribution to streamflow from the above to densely growing stunted trees. That one-third of the precipitation in such areas never reaches the ground and the other two-thirds is eagerly taken up by the stunted trees.

I believe that the thinning of the above 180,000 acres to the proper number of trees would materially increase the flow of the streams of the Black Hills.

The cost of this thinning I am not sure of. Where it has been done in a very limited way by the Forest Service it has cost about $25 an acre.

Without any appropriation whatever from Congress the cost could be met by the sale to private owners of about 1 million acres of L.U. pastureland bought originally in the same thirties to help our local county governments out of their financial difficulties and held now for no good reason I can see whatever. I want to say on the aside that that paragraph there has not the recommendation or the backing of the Forest Service. That is my own original suggestion.

The Indians of our reservations would make good thinning crews and it would give them much needed employment off the reservation and if they are going to ever be removed from Government support they must learn steady work.

The Indian Bureau and the Forest Service may or may not approve of all I have said but I wish to close by complimenting both on the cooperation they have shown in the employment of the Indians in the Black Hills Forest.

I might add that the work they have done so far, and they did it pretty well, is planting trees. You know this situation as well as I do, Senator Case. I think that the 20 years I have stated that would elapse between the thinning of these trees, while it was the experiment station experiment last year, the trees they have thinned are growing like wildfire this year and I believe that 20 years is way too long as it was done by the soil conservation. It was dry years then.

I think it would be a much shorter period. I believe this, that the sale, just the sale of posts, poles, and pulpwood would pay the cost of thinning those trees on the 180,000 acres and leave the Government the profit of the sawtimber that eventually would develop.

Senator CASE. Is it not true, Mr. Chase, that at the present time the post industry has half a dozen plants in the Black Hills area taking this kind of small tree you described, treating it under one of these pressure treatments, with certain chemicals and producing a very substantial industry with a large output of posts?

Mr. CHASE. Correct. That is right.

They are using the stands, are they not, largely that the Civilian Conservation Corps. planted? That is where the 25,000 came from.

Senator CASE. Is it not also true within the past year a considerable pulpwood industry has developed with the shipping of several cargoes of pulpwood to treating plants in other States?

Mr. CHASE. Yes, and it is growing rapidly. Just last month the Milwaukee Railroad announced that they were reducing their freight rate so as to get the pulpwood to the Mulciney area of Wisconsin, their plant.

Senator CASE. That is a source of revenue both for private industry and the Government that was not in existence 5 years ago?

Mr. CHASE. That is correct.

The CHAIRMAN. What is your population in that area, Mr. Chase? Indian?

Mr. CHASE. I would rather let the Indian Bureau answer. In Pine Ridge alone I think we have 10,000 or 12,000. In Rapid City we have several thousand.

Senator CASE. Ten percent of the population of Rapid City today is Indian, isn't it?

Mr. CHASE. That is possible. It is hard to estimate.

Senator HART. What are the tribes?

Mr. CHASE. The tribe in Rapid City comes from all around. The tribe in Pine Ridge is Oglala Sioux.

Senator CASE. They are different Sioux Tribes and they do contribute to Rapid City from each of the reservations. They go there simply to work.

Mr. CHASE. The Indian Bureau helps them. They like the forest. I really believe they do. I believe they much prefer the forest to Rapid City.

Senator CASE. Thank you very much. I understand Mr. Towle is present now. Mr. Towle is the Superintendent of the Pine Ridge Reservation. We would be glad to have Mr. Towle present his statement if he so desires, in person.

STATEMENT OF LESLIE P. TOWLE, SUPERINTENDENT OF THE PINE RIDGE RESERVATION

Mr. TOWLE. Senator Kerr, Senator Hart, and Senator Case, I am here today primarily as a representative of the executive committee of the Oglala Sioux Tribe to present this statement by Mr. Frank Ecoffey, who is a member of the executive committee and he cannot be here today. I do not believe it is necessary to read this to the committee because I don't want to take up any more of your time. The

statement, I think, is sufficiently comprehensive to give you some idea of the problems that we have there.

I merely wish to make a supplementary statement by saying that our main problem is one of the conservation of whatever rainfall we get, which averages, as you will note, only about 12 inches a year. We need to conserve every drop of water that falls there if we are going to lend any stability to the livestock industry on the Pine Ridge Indian Reservation. That conservation could come from the construction of small dams, to contain runoff, the construction of water-spreading devices to get some of the water over the land so that we could increase our feed supplies through the production of hay, either native grass or the other types of hay and feed, and that would certainly lend itself to the kind of stability that we need in that area if we are going to get some real economic benefit out of the resources of the reservation.

A lot of our Indian farmers and ranchers are what you might call marginal operators. If they were to experience 1 or 2 bad years they would probably be out of business.

Senator CASE. Not merely out of business but also on the Government.

Mr. TOWLE. That is correct, sir. So what we would like—the Indians keep reminding us the Federal Government has promised some development of their resources and they would like to have some consideration given this problem of water conservation which would also provide some employment opportunities for the Indians right there in the development of these kind of soil structures and the construction of dams and so forth all over the reservation. You can get water supplies, we can have, I think, a good livestock industry. Just this year there were any number of our operators that had to move to winter range about 2 months early because the streams and water supplies that they had on their summer range had all died up.

I think that kind of thing represents a hazard to these people and it could be ameliorated through the kind of construction effort and the kind of work that could be done in the conservation of the water supplies.

Senator CASE. Mr. Towle, in looking at Mr. Ecoffey's statement, which you have submitted for the record, I notice that he refers at the bottom of page 3 to the proposed Slim Buttes project of the White River Division.

Mr. TOWLE. Yes, sir.

Senator CASE. Pointing out that that could provide for storage of about 60,000 acre-feet of water and irrigate 12,000 acres of suitable land.

Mr. TOWLE. Yes.

Senator CASE. And then he refers to a few other small projects, one of 50 acres at Kyle, 500 at White Clay, 2,000 at Oglala, 500 at Denby, 1,200 at Kisle, and 1,000 at Merdanian using a spreader system.

Mr. TOWLE. Yes.

Senator CASE. From what you know of the reservation and the nature of the economy on which the Indian people rely for their livelihood, is it your opinion that these small tracts suggested here, if irrigated, would contribute to the production of surplus grains in the country or would they provide largely foodstuffs and some reserve

feed supplies that would stabilize the economy of the Indians in the area?

Mr. TOWLE. I think entirely the latter, Senator Case. I might say to this committee what the Indians gave last week when the Indian Affairs Subcommittee was at Pine Ridge, we have had this last summer on the Oglala project, which was built sometime in the thirties, we have had an honor farm. The Oglala Sioux Tribe has really taken hold of this thing and they have taken their prisoners out of jail and have taken them out to this honor farm and they worked the farm this year. We thought they had some very good experiences out there and produced, I think, enough supplies in the way of vegetables that they have canned to probably supply quite a little bit of the foodstuffs they will need this winter.

The proposal now is to expand that enterprise so that they can get a number of families. They want to start small, possibly 25 families, with about 10 acres apiece to produce crops, in the form of potatoes and tomatoes and the kind of vegetables and stuff that they can add to their home supplies and they estimated that that kind of an operation would probably produce maybe $500 worth of income over and beyond the amount that the family itself could use, which is more than they get by going on these jobs outside the reservation on migratory work because they generally come back on the reservation and are broke. So we thought this was a very splendid thing that the tribe was proposing and we may need some little assistance in getting that Oglala project put together.

As you will recall, we are using part of the money that you appropriated or had appropriated for the Wounded Knee project on this Oglala project and we are hopeful that we can restore part of it now for that kind of utilization. All of it will be for row crops and the kind of things that will contribute to the home economy rather than anything else that might go into surplus.

Senator CASE. Could you say what the average cash income is of the Indian family on the Pine Ridge Reservation today?

Mr. TOWLE. Their total income, which largely comes from welfare, would be about $900 a family.

Senator CASE. About $900 a family?

Mr. TOWLE. Yes, sir.

Senator CASE. That is largely——

Mr. TOWLE. Unearned income from welfare and from rentals.

Senator CASE. To the extent that these small garden projects or 10-acre tracts you speak of provide them with a better subsistence living that would supplement that income or perhaps replace it?

Mr. TOWLE. Very much so; yes, sir.

Senator CASE. Are there any other questions?

The CHAIRMAN. Let me ask one question. What percentage of the cattle in the reservation are being operated as livestock operations of your Indians?

Mr. TOWLE. About 40 percent, sir.

The CHAIRMAN. About 40 percent?

Mr. TOWLE. Yes.

The CHAIRMAN. Is the entire reservation fully utilized from the standpoint of livestock production?

Mr. TOWLE. It is at the present time. Those lands that are not fully utilized by the Indians are, of course, rented out to non-Indians. But the entire area is being rented and utilized.

The CHAIRMAN. What is the population of the tribe?

Mr. TOWLE. The residence population there at the present time is about 7,800.

The CHAIRMAN. Of the tribe that is interested in the reservation, who participate in the income?

Mr. TOWLE. About 7,800. That represents about 1,975 families.

The CHAIRMAN. Thank you.

Senator CASE. With the better distribution of water supplies, would the grazing be better distributed? Aren't there some high areas? What I had in mind was I thought there were some high areas there in the Pine Ridge off toward the country north of there that the water supply is inadequate for proper grazing of the resource.

Mr. TOWLE. That is true. We are charged with the responsibility as a Government agency for the utilization of the range on a sustained yield management basis and by reason of the fact that we do not have adequate water supplies that are properly distributed over the reservation we get some areas that are overgrazed and other areas that are undergrazed and it complicates our problem of management considerably. So we could do a much better job if we had a water supply.

Senator CASE. Thank you very much.

(The prepared statement follows:)

STATEMENT OF MR. FRANK A. ECOFFEY, MEMBER OF THE OGLALA SIOUX TRIBAL EXECUTIVE COMMITTEE AND A STOCKMAN AND RANCHER OF THE PINE RIDGE RESERVATION

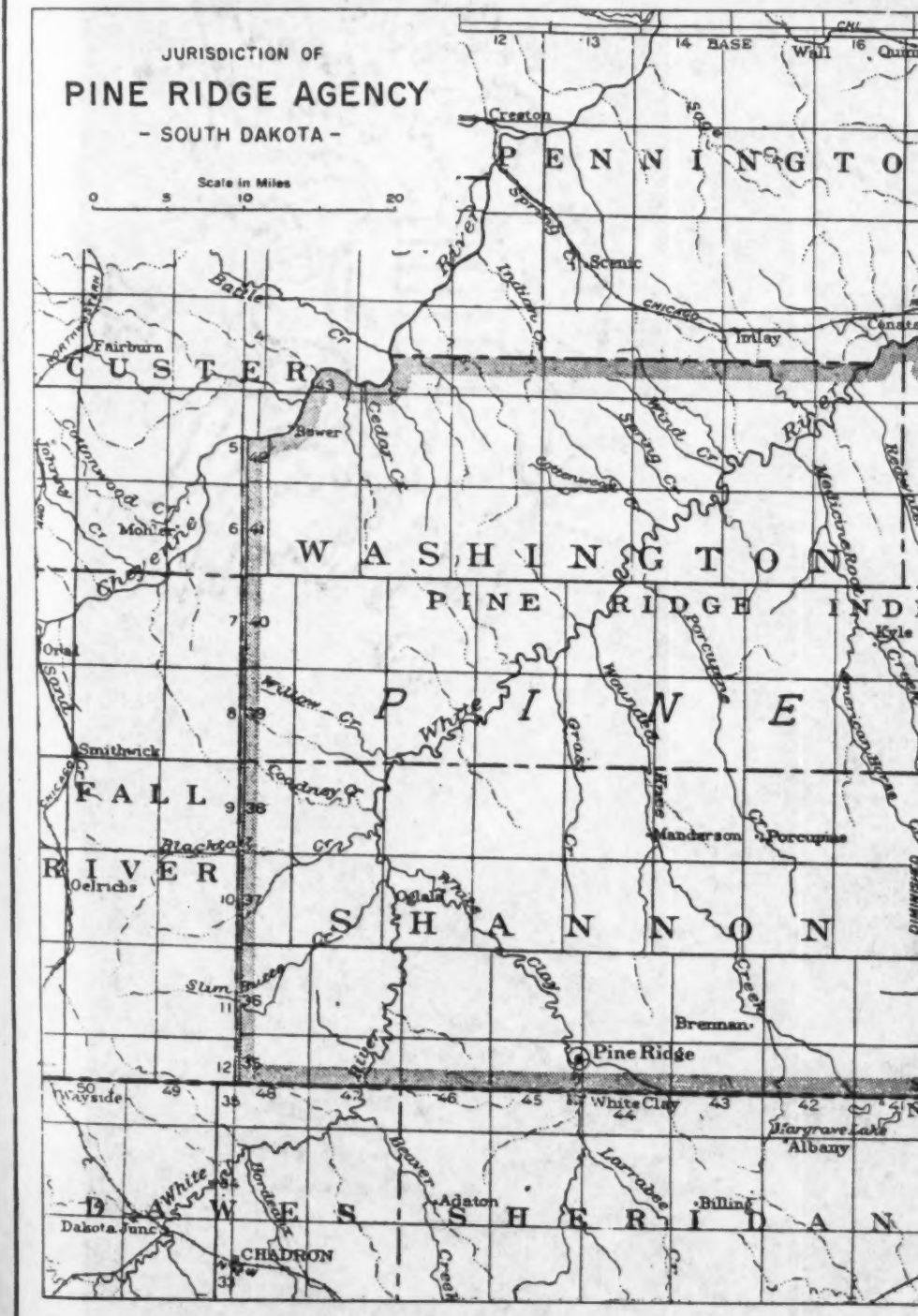
Mr. Chairman and members of the committee, I am an enrolled member of the Oglala Sioux Tribe of the Pine Ridge Indian Reservation.

I am appearing before your committee today on behalf of the 7,000 Indian residents of the Pine Ridge Indian Reservation and the many non-Indians who use our natural resources through livestock and farming operations. All are vitally interested in development of our water resources to the end that (1) our property and soil will be protected against the ravages of uncontrolled water, (2) sufficient runoff will be retained to provide a dependable livestock water supply throughout the year, and (3) the thousands of known suitable acres may be placed under irrigation and, thus, serve to raise the living standard of our people by providing an opportunity in agriculture.

The Pine Ridge Indian Reservation contains 1,636,000 acres of trust Indian and Government-owned land. Approximately 1,300,000 acres or 80 percent of the total are in range units involving 417 grazing permits and the grazing of 65,000 cow units of livestock. It is in this area that much water conservation work needs to be done, particularly in the development of (1) stock watering facilities, and (2) water spreader systems to increase the production of better quality hay.

Most all of the range units in operation at Pine Ridge are poorly watered to the extent that utilization of the forage within them is limited to that area around existing stock water developments within the travel distance of the grazing animal. It is conservatively estimated that 1,000 structures would be needed to bring about proper utilization of the available forage present in these range units. The results of a completed program would be evident in reduced overutilization of areas around existing water and in increased meat production made possible by the added forage thus made available to livestock.

Critical stock water shortages in 1957, and again in 1959, have served to point up the real need for a water development program designed to insure adequate supplies during periods of drought. During both of the above years, the White River was dry from a point several miles south of the State line, thence northeasterly across the reservation, and on to its confluence with the little White



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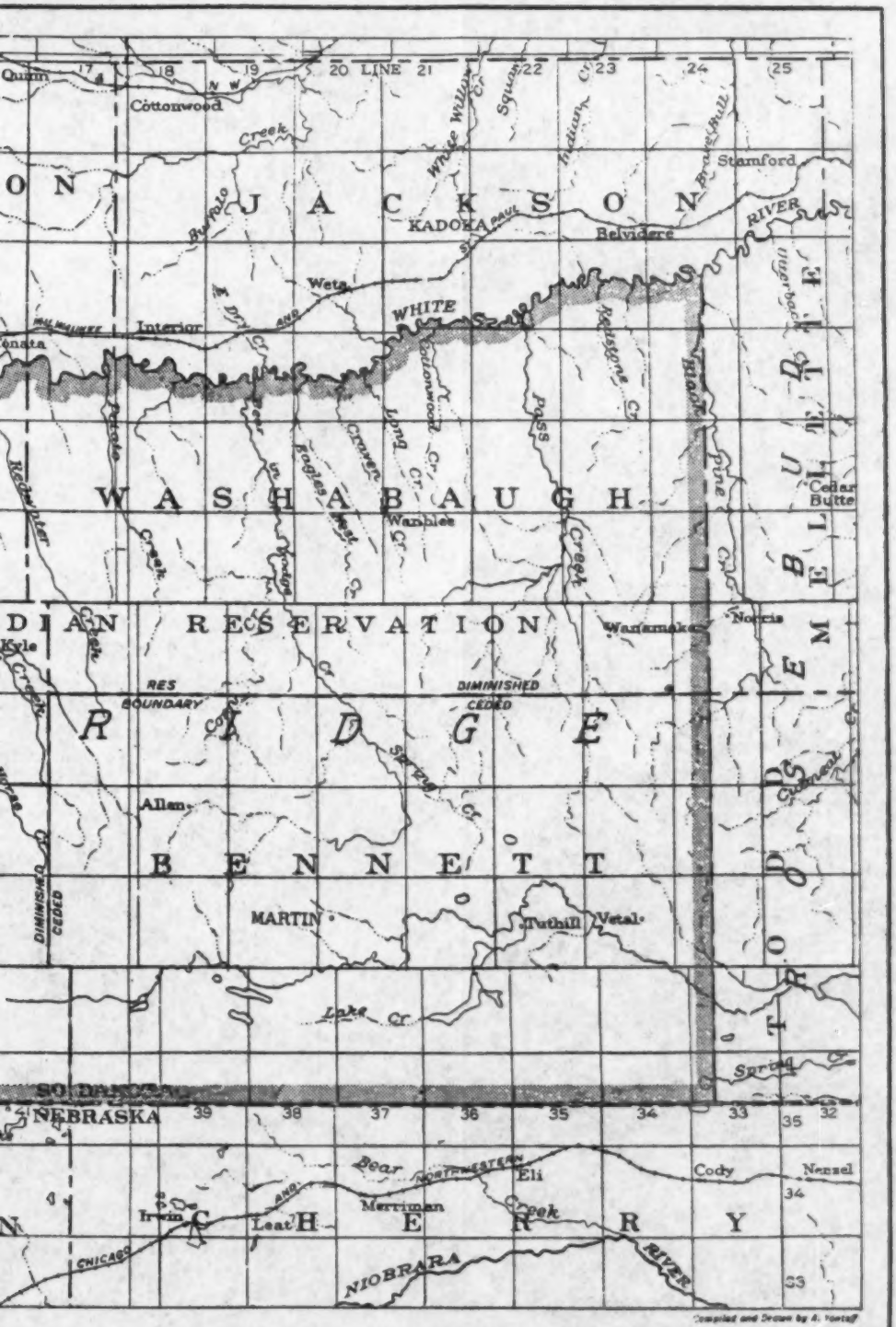
Quinn
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Cedar Butte
BELLE FOURCHE
RESERVATION
Wanamaker
Norris
Kyle
RES BOUNDARY
DIMINISHED CEDED
RIDGE
Allan
BENNETT
MARTIN
Tuthill
Vetal
Lake Cr
Spring Cr
SO DAKOTA
NEBRASKA
Bear
Eli
Cody
Nenzel
Irwin
Merriman
Creek
CHICAGO
NIOBRARA RIVER
Compiled and Drawn by A. Vontaff

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River. Oldtime residents of the area state that this has been the case in 7 of the last 10 years. Within this area, the river traverses 43 range units, grazing 9,692 head of livestock dependent, in part at least, on the river for water.

During the same 2 years, all but one tributary stream to the main stem of the White River within the boundaries of the reservation were dry. The exception was White Clay Creek. Only through use of stored water from White Clay and Oglala Reservoirs was it possible to maintain flow throughout its length. The flow of many wells and prings ceased or was materially reduced. Stockmen resorted to emergency measures, moving stock to reserved winter ranges where some water was available, deepening old wells or drilling new ones, and, in some cases, hauling water in tanks from distant sources. Indian families living along the White River and its tributaries habitually use the water for both household and livestock needs. They too were compelled to transport water to satisfy those needs. A critical need for the stabilization of streamflow in the White River drainage is indicated.

The irrigation potential of the Pine Ridge Indian Reservation is considerable. This fact has been brought to light through a preliminary draft dated January 1959, published by the Bureau of Reclamation describing the proposed Slim Buttes project of the White division. Construction of the dam would provide for storage of 60,000 acre-feet of water and the irrigation of 12,712 acres of suitable land downstream. It would also completely stablize streamflow across the reservation. Several other sites exist on which plans have been developed and some work accomplished. The potential irrigable acreage involved in each is as follows:

	Acres
1. Oglala	2,000
2. Whit Clay	600
3. Kyle	50
4. Denby	500
5. Misle	1,200
6. Merdanian (spreader system)	1,000

The White River drainage area is semiarid. Precipitation measurements since 1929 show a variation from 6.7 inches to 18.2 inches with an average for the period of 12.1 inches annually. The amount of water needed for crop production has been computed by the Lowry-Johnson method to be 24.25 inches. The average rainfall, then, is about one-half the amount required. Although two-thirds of the precipitation occurs during the May to September growing season, the moisture is not advantageously distributed over the season. As a result, production from dryland farming is extremely variable and frequent crop failures are experienced. Extensive damage to rangelands and livestock herds may also occur. Attendant hardships befall the inhabitants. Stabilization of the agriculture of this area is urgently needed to eliminate periodic abandonment and resettlement of lands. The only answer is water conservation in all its many facets, together with full utilization of all related natural resources.

On behalf of the Oglala Sioux people, I wish to express sincere appreciation to your committee for visiting our State to conduct this hearing. I hope that the foregoing statements will provide you with a part of the information necessary to a solution of the dangerous water resources problems affecting all of our great Nation.

Senator CASE. Mr. Warren Libakken, representing the James River Flood Control Association.

STATEMENT OF WARREN LIBAKKEN, JAMES RIVER FLOOD CONTROL ASSOCIATION

Mr. LIBAKKEN. Senator Kerr, Senator Hart, and Senator Case, I may digress a little bit from the prepared text of this statement from time to time. My name is Warren Libakken. I am a farmer and I live in Menno, S. Dak., in Yankton County.

I am here today representing the Yankton-Hudson County Flood Control Association which is composed of farmers and landowners and others interested in development of flood control on the James

River in the lower reaches of the river. We are members of the James River Valley Association, and this association is made up of people in North Dakota and South Dakota who want to see the James River Valley developed.

Our problem and those of my neighbors are floods along the south part of the James River in Yankton and Hudson Counties. We understand from the Corps of Engineers and the Bureau of Reclamation that flood control will be a part of the Oahe irrigation project upstream. The flooding of our croplands during the planting season is our greatest problem. We would also like to see the Lake Byron part of the irrigation project built first. We would like to have as much flood control built into this reservoir as is possible. We have been told that this reservoir can be built for flood control as well as irrigation and city water supplies. This would be a big help to us during spring floodtimes as the snowmelt from the snow causes us our greatest difficulty. We need this flood control and we need flood control south of the irrigation project. The Corps of Engineers and the Soil Conservation Service are studying the job.

Present cost ratio computed on present land use, we believe the capacity capability considered, would be higher if flood hazard were removed.

We have not seen the irrigation project report but we have been told it will be finished next year. The other reports for downstream flood control projects are not finished either. All of us hope that these projects can be built soon.

We haven't had a serious flood on the James River for 7 years. We have been short of water during these dry years. The floods will come again. I hope that something can be done before they do come.

Thanks for the privilege.

Senator CASE. Thank you, Mr. Libakken. Are there any questions?

Senator CASE. That completes the witness list as we have it.

We do have word from Congressman McGovern that he was unable to be here today but would like to submit a statement for the record and that will be received and entered when received.

If there are any others present who wish to have their presence noted, they could leave their names with the clerk here.

(The statement of Congressman McGovern follows:)

STATEMENT OF HON. GEORGE S. MCGOVERN, REPRESENTATIVE FROM THE STATE OF SOUTH DAKOTA

Mr. Chairman and members of the committee, I am grateful to the committee for the opportunity to appear before you in connection with the authorization of a study by the Corps of Engineers to determine whether improvements for slack water navigation of the Missouri River from Yankton, S. Dak., to the mouth are advisable and economically feasible. I made a request for the authorization of such a study in a letter to Chairman Buckley of the House Public Works Committee on July 17. On August 26, 1959, I testified before the House Public Works Committee in support of the proposed navigation survey, and the committee has instructed the Corps of Engineers to proceed with the survey.

I shall not take up much of the committee's time, but I do want to tell you that the availability of a sufficient supply of water is the single most serious problem facing Souh Dakota at this time. This year has been one of the driest in the history of the State. We need to be deeply concerned by the fact that the water which would be available to us from the Missouri River is being wasted by being released 8 months of the year to permit free flowing naviga-

tion downstream. This water will be sorely needed for domestic and irrigation purposes and for the generation of electric power in South Dakota and the other upper basin States. While irrigation has not been developed to a large extent as yet, the experience of our farmers in this year of drought indicates how badly it is needed. Before too long the requirements in the upper basin States for irrigation alone will make it impossible to release the water necessary to provide for free flowing navigation below. There is bound to be a sharp conflict between the upper and lower States.

At the present time the REA cooperatives and the municipalities are being deprived of hundreds of thousands of kilowatts of electric power from the hydroplants already installed on the Missouri because the water is not permitted to flow through the generators in the wintertime when the power is needed, but is stored to be released during the navigation months. The installed capacity at the exising dams, excluding Big Bend, will be roughly 1,600,000 kilowatts by 1963. Due to the wasteful use of the water, only approximately 1 million kilowatts of this capacity is being contracted to be sold as firm power by the Bureau of Reclamation. This means that a considerable portion of the requirements of the preference customers will have to be obtained from other sources at a cost more than double the Bureau rate. Most of the cooperatives in South Dakota were unable to obtain loans from the REA prior to Bureau power becoming available. Due to the low density of their consumers, many serving not more than one farm or ranch per mile, it was impossible for those cooperatives to develop projects which could repay the REA loan until the low-cost hydropower became available.

If that law-cost power is now denied them because of the improvident management of the waters of the Missouri, the repayment of their loans to the Government will be placed in jeopardy. The same is true in the other upper basin States. I am informed that if a system of slack water navigation were provided, almost the entire 1,600,000 kilowatts of capacity could be sold as firm power and navigation could still be carried on downstream in even more favorable circumstances than now. In addition, a vast additional generation capacity would be made available downstream in connection with slack water development.

At my request, Mr. Leland Olds, director, Energy Research Associates, has prepared a memorandum outlining the background of a slack water navigation program for the Missouri River below Yankton. Mr. Olds, who is a former Chairman of the Federal Power Commission, indicates that such a program offers these advantages:

(1) Better navigation, because the barge traffic will not be affected by the current which results from the fact that the river falls a total of 770 feet from the tail water of the Gavins Point project to its confluence with the Mississippi River.

(2) Assurance that the right of the upper States to use Missouri waters for irrigation and other consumptive purposes will not ultimately curtail downstream navigation of the desired depth.

(3) Better use of the available flows for power purposes at the presently constructed and authorized main stem projects from Gavins Point upstream to Fort Peck through eliminating the need for large releases of water during the navigation months and providing greater assurance of maintaining reservoir levels.

(4) Development of 2,200,000 kilowatts of very good hydroelectric power from the 770-foot head between Gavins Point and the mouth, using the flows to produce some 12 billion kilowatt-hours of electricity.

(5) Improved management of the sediment which is one of the major problems of the basin, with possibilities that sound sediment engineering can transform it from a liability into an asset.

I offer a copy of Mr. Olds' memorandum for the record of this hearing. I am certain the committee will find it most useful.

I should like to point out that my proposal seeks to develop the Missouri River along the identical lines as has the Tennessee River and the Ohio River and virtually all of the other rivers of the country where navigation is carried on to any considerable extent. I am pleased to report that the Inter-Agency Basin Committee has approved the study of slack water navigation. Many of the Governors of the basin States have individually urged that the study be made by the Corps of Engineers.

South Dakota is extremely anxious not to become involved in conflict with our good friends in the States below us. However, we cannot sit idly by and watch our economy deteriorate because water which is made available by dams built in our State, and which dams resulted in thousands of acres of our good farmland being taken out of production, is being denied to us and given to others. We believe that we can have the use of the water which is vital to our welfare, and at the same time our friends downstream can have their wants taken care of if the river is properly developed. For that reason I respectfully urge this committee to authorize the necessary study.

SLACK-WATER NAVIGATION PROGRAM FOR THE MISSOURI RIVER BELOW YANKTON—MEMORANDUM BY MR. LELAND OLDS

A comprehensive program for multipurpose development of the Missouri River Basin requires improvement of the main stem below Yankton for slack-water navigation and hydroelectric power as a complement to the presently authorized programs of the Corps of Engineers and Bureau of Reclamation. In terms of the great values which such an addition to the program offers, the undertaking of the necessary studies by the Corps of Engineers is urgent.

The slack-water navigation program for the lower river has been considered as a solution to these problems: (a) How to assure, particularly during long dry cycles, ample water for irrigation and other consumptive purposes while maintaining 9-foot navigation below Yankton; (b) how to assure optimum use of power installations to meet demands for electricity without sacrificing navigable depth in the lower river; and (c) how to conserve the full hydroelectric potential of the river system.

BENEFITS OFFERED

Slack-water navigation in the Missouri River between Yankton and its mouth offers the following advantages:

(1) Better navigation, because the barge traffic will not be affected by the current which results from the fact that the river falls a total of 770 feet from the tail water of the Gavins Point project to its confluence with the Mississippi River.

(2) Assurance that the right of the upper States to use Missouri River waters for irrigation and other consumptive purposes will not ultimately curtail downstream navigation of the desired depth.

(3) Better use of the available flows for power purposes as the presently constructed and authorized main stem projects from Gavins Point upstream to Fort Peck through eliminating the need for large releases of water during the navigation months and providing greater assurance of maintaining reservoir levels.

(4) Development of 2,200,000 kilowatts of very good hydroelectric power from the 770-foot head between Gavins Point and the mouth, using the flows to produce some 12 billion kilowatt-hours of electricity.

(5) Improved management of the sediment which is one of the major problems of the basin, with possibilities that sound sediment engineering can transform it from a liability into an asset.

GOVERNORS SUGGEST SLACK WATER IN 1944

At the February 18 and 22, 1944, hearings, before the Committee on Rivers and Harbors of the House of Representatives, considering the river and harbor bill, Governors and other representatives of upper Missouri Basin States suggested slack-water navigation on the lower river as a means of protecting full use of water for irrigation.

Thus Gov. John Moses, of North Dakota, presenting a joint statement with Gov. Sam C. Ford, of Montana, and Gov. Lester C. Hunt, of Wyoming, said:

"We are not opposing the use of a reasonable amount of water for navigation below Sioux City but we are emphatic that the use in perpetuity of 32,000 or 35,000 cubic feet per second out of an average annual flow of 37,600 does not constitute either the most economic or the most beneficial use of such a valuable natural resource. If there could be inserted in the river and harbor bill or this committee should insert in your flood control bill language which guarantees a certain fair and equitable portion of Missouri River water for upstream consumptive use, an amount which might be agreed upon, and provide further a program for ultimately installing lock and dams so that as upstream demands

increased the lock and dam installation program could provide the same or better water navigation with less and less water, thus releasing more and more water for upstream use, we believe that you would be pointing in the direction of a fair and equitable solution to the problem, and greatly aid in a constructive economic development of the entire Missouri River Basin" (p. 4).

In this hearing Representative Frank A. Barrett, of Wyoming, said:

"We have not the slightest conflict with flood control on the Missouri. We want it. We really have not any conflict with navigation. If they would install locks and dams below Sioux City they can have navigation; but if there is a conflict, then I would say by all manner or means the people living in the upper States of the Missouri River Basin are entitled to first use of the water" (p. 38).

In the same hearing Commissioner of Reclamation Harry W. Bashore pointed out that "the future development of such States as Montana, Wyoming, North Dakota, South Dakota, Nebraska, Kansas, and Colorado will require additional irrigation." He said:

"It seems to me that the Congress should consider the effect the proposed navigation project and the closely coordinated flood-control projects presently before this committee may have on upstream irrigation developments. Perhaps only still-water navigation effected through the installation of a system of locks would permit the proposed 9-foot channel consistently with the increased consumptive use upstream for irrigation that is essential in the interest of the upper basin States" (p. 33).

To meet the questions raised as to possible conflict in use of waters between future irrigation and the proposed 9-foot waterway in the lower river, the O'Mahoney amendment was added to the bill, which provided:

"SECTION 1. (b) The use of navigation, in connection with the operation and maintenance of such works herein authorized for construction, of waters arising in States lying wholly or partly west of the 98th meridian shall be only such use as does not conflict with any beneficial consumptive use, present or future, in States lying wholly or partly west of the 98th meridian, of such waters for domestic, municipal, stock water, irrigation, mining, or industrial purposes."

POWER POTENTIAL IN CONNECTION WITH SLACK-WATER NAVIGATION

During the later 1940's Federal Power Commission engineers, speaking at meetings of the Midwest Power Conference and the Missouri Inter-Agency River Basin Committee, called attention to the power potential available in connection with slack-water navigation program for the lower river. Speaking before the Midwest Power Conference in Chicago, April 4, 1946, B. H. Green, Federal Power Commission regional engineer, placed the total potential power in the Missouri Basin at about 5 million kilowatts, with an average annual generation of 25 billion kilowatt-hours. He said:

"As an instance of potential power may be mentioned the main stem of the Missouri River from Gavins Point on down to its mouth. In this reach there is a fall of about 700 feet and a potential possibility of from 10 billion to 15 billion kilowatt-hours per year. The eventual development of all or part of this is, of course, problematical; but it is important that the possibility of its realization be kept in mind, especially in the Commission's recurrent appraisals of power possibilities and probabilities" (p. 2).

This was in general reiterated in 1947 at a Cheyenne, Wyo., meeting of the Missouri Basin Interagency Committee, by Lester C. Walker, engineer, of the Federal Power Commission Chicago Regional Office.

FEDERAL POWER COMMISSION MEMORANDUM EMPHASIS NEED FOR REEXAMINATION OF MISSOURI RIVER BELOW GAVINS POINT

In its memorandum of May, 1950 on the Missouri River Basin, prepared in response to a request from the President's Water Resources Policy Commission, the Federal Power Commission referred to 119 projects in the category of undeveloped power in the basin which "would provide an estimated aggregate installed capacity of 6,195,000 kilowatts with an average annual generation of 30,987,700 kilowatt-hours." This is additional to the 8 projects then under construction and the 19 authorized, with combined capacity of about 2,400,000 kilowatts and combined energy of about 10 billion kilowatt-hours.

Concerning the potential in the lower river the Commission memorandum says:

"That portion of the Missouri River main stem from the Gavins Point damsite to the mouth has been surveyed and studied for navigation and flood control, and construction work to provide open river navigation and flood protection by levees is in progress. Extensive surveys and studies to determine the feasibility of developing the power potentialities of this stretch have not been made. However, this section should be thoroughly reexamined in the light of the reduced silt load anticipated and in view of the changed regimen of the river that will obtain following the completion of the presently authorized storage reservoirs above Sioux City for the purpose of determining the feasibility and practicability of developing the potential of 2,200,000 kilowatts of hydroelectric power capacity in the stream, possibily in connection with the development of slack-water navigation" (pt. I–3).

After some discussion of the Commission principles of project formulation, the Commission memorandum proceeds:

"Considerable in the way of additional investigations are necessary in the Missouri Basin before it can be felt that the Commission's principles of river basin development have received full application to further possibilities for the development of power. An important case at point are the possibilities for slack water navigation below Yankton, S. Dak., with attendant large blocks of power, improvement of power output at the main stem dams at Gavins Point and above, and a very beneficial easing of conflicts in water use between upper and lower basin States" (pt. II–11).

Then, in discussing specific policy problems as they have developed in the Missouri Basin, the memorandum has the following to say about conflicts between upstream and downstream interests in the use of the water resources of the basin:

"The use of water for irrigation purposes in the upstream areas of the Missouri River Basin conflicts with its use for navigation and other purposes in downstream reaches of the river by reducing the available flow at downstream points. However, existing legislation subordinates the use of water for navigation in the basin to its use for irrigation. There is the possibility, therefore, that future irrigation development may so reduce the flow as to jeopardize the planned open river navigation on the lower Missouri River. In this event, maintenance of navigability of the river would require the provision of slack-water navigation, which would permit the fullest development of irrigation upstream and also make possble the production of large amounts of hydroelectric power" (pt. III—1–2).

After recognizing the sediment problems in connection with any plan of development in this river basin, the Commission memorandum then turns to a specific discussion of the advantages of a power and slack-water navigation program below Yankton, S. Dak. It says in part:

"Large reservoirs on the upper river are being built to impound surplus waters of the upper basin to create a dependable source of water for irrigation, navigation, power, and domestic and industrial water supplies. Under present plans there will be conflicts and limitation in the use of water because of a disproportionate storage development which provides adequate control in the upper basin above Yankton and very little control in the lower basin. The lower river must rely in major part on storage reservoirs in the upper basin for flow regulation for navigation and other purposes. The 'Pick-Sloan plan' has partially resolved the conflict between upstream use of water for irrigation and downstream use for navigation by provision of large holdover storage reservoirs designed to operate for both purposes.

"It is possible that there may not be sufficient water in the upper basin for the long-range development of both upstream irrigation and downstream navigation of the desired depth unless the lower river is canalized for power and slack water navigation, accompanied by greater regulation of water and silt originating from tributaries of the lower basin. A plan for slack water navigation would make possible the development of hydroelectric power of a better character than is now possible at upper main stem projects, and more efficient navigation, and would resolve, in large part, conflicts and limitations in the use of water. Under such a plan, the water available for irrigation would be less restricted, reservoir operation would provide for augmentation of low flow and power when most needed in fall and winter and at a time when Mississippi River navigation needs additional flow, floodflows would be reduced by additional reservoirs and retarding basins, and navigation would be improved by a waterway with more depth and less velocity.

"Although sufficient studies have not been made to determine exact methods of developing slack-water navigation, if the silt and river stabilization problems can be resolved, and if slack-water navigation and power can be developed feasibly, an aggregate power installation at lower main stem dams of about 2,200,000 kilowatts could be made, capable of generating, in the average year, about 12 billion kilowatt-hours after allowance for irrigation depletion" (pt. III–5).

CORPS OF ENGINEERS PREPARED TO DEAL WITH SEDIMENT PROBLEM

In a corresponding report to the President's Water Resources Policy Commission, dealing with the Missouri River Basin, the Corps of Engineers discusses at some length its preparedness for dealing with the sediment problems of this basin. In this report the corps says:

"Because of the importance of the sediment problem to many projects under the jurisdiction of the Corps of Engineers, the Missouri River division of the Corps has well underway an unprecedented and comprehensive sediment study program which is aimed at protection against possible sediment hazards and at taking advantage of certain sediment phenomena to induce more prompt and complete control of the Missouri River. In the conduct of this program, the advice and assistance of most of the recognized authorities in this field are being utilized" (pt. III–11).

The Corps of Engineers report summarizes its work on the sediment problem as follows:

"In summary, Corps of Engineers procedure in regard to the sediment problem involved in the development of water projects in the Missouri Basin is guided by a policy of (1) searching out and evaluating in advance all types of potential sediment hazards and opportunities, (2) making adequate provisions for handling potential sediment hazards associated with Corps projects, and (3) deliberately planning to take full advantage of new valuable opportunities which may be afforded by sediment phenomena" (pt. III–12).

PRESIDENT'S WATER RESOURCES POLICY COMMISSION CONSIDERS SLACK-WATER POSSIBILITY

In its report to the President, volume II, entitled "Ten Rivers in America's Future" (1950) the President's Water Resources Policy Commission included an analysis of the potentialities and problems of the Missouri River Basin. In its tentative list of hydroelectric power possibilities other than projects under construction, authorized, and recommended or contemplated, it includes the following between Yankton and the mouth of the river:[1]

	Ultimate capacity (kilowatt-hours)	Average annual energy (kilowatt-hours)
Yankton to Sioux City	160,000	700,000,000
Sioux City to Nebraska City	400,000	2,200,000,000
Nebraska City to Rulo	100,000	600,000,000
Rulo to Kansas City	340,000	2,000,000,000
Kansas City to mouth	1,200,000	6,500,000,000
Total	2,200,000	12,000,000,000

Pointing out that "further study is required to determine more definitely the details and desirability of such projects" it says: "For example, the totals include some 2.2 million kilowatts of capacity that might be developed in connection with slack-water navigation on the Missouri River below Yankton. Such possibilities are contingent on solving such difficult problems as sedimentation, obtaining adequate foundations for project structures, pollution, valley land inundation, seepage of valley lands, and relocation of existing facilities" (pp. 178–179).

Referring to the fact that the 15 million acre-feet of water required during the navigation season "cannot yet be accepted as a certainty during an extended dry

[1] These are not specific projects but potentialities in connection with slack-water navigation development of specified reaches of the river.

period" the report continues, "the compatibility of navigation therefore must be examined in the light of possible adjustments in the navigation plan to reduce its flow requirements." It lists such possible adjustments as "increased channel maintenance; shortened navigation seasons; refinement of bank stabilization control works; and slack-water navigation" (vol. II, p. 200).

Later, in discussing the rate of power development and integration with navigation and other purposes, the President's Water Resources Policy Commission report on the Missouri Basin says in part:

"The possible future provision of slack-water navigation on the Missouri River between Yankton and the mouth would make possible the development of some 2.2 million kilowatts of generating capacity in the area of greatest need. Such development would improve navigation conditions by reducing velocities, and help resolve possible conflicts between consumptive use of water upstream and navigation requirements downstream.[2] It would also improve the character and value of power produced at main stem reservoirs by eliminating the need to conserve water for navigation months, a procedure which results in reduced flow during winter months, and smaller power output.

"Power possibilities at reservoirs on lower basin tributaries would also be improved by slack-water navigation on the Missouri River. The large planned water releases from these tributary reservoirs in the interest of navigation on the Mississippi River could be reduced if larger winter releases were permitted from main stem Missouri reservoirs" (vol. II, p. 256).

The report refers to the future needs for power in the lower Missouri River Basin and notes that some of it may be supplied from the 2.2 million kilowatts developed as part of the slack-water navigation plan. It adds: "The possibility of this needed power gives added justification for slack-water navigation works. However, development of this power, like navigation, can proceed only after sediment control and channel stabilization are well along" (vol. II, p. 256).

SENATE INTERIOR COMMITTEE HEARINGS ON FEDERAL POWER MARKETING PROBLEMS SUPPORT URGENCY OF SLACK-WATER NAVIGATION SURVEY

Important testimony before the Senate Committee on Interior and Insular Affairs, in its hearings in February 1959 on Federal Power Marketing Problems, supports the conclusions that full use of Missouri waters for all purposes will be incomplete without provision for slack-water navigation in the lower river below Yankton, S. Dak. Among other things, the evidence is clear that the large releases of water, required to maintain 9-foot depth navigation during the 8-month navigation season, result in the production of a surplus of energy at the mainstem powerplants during the summer, balanced by corresponding deficit of energy to support the capacity available in winter months.

Early in the hearings a witness placed in the record a joint memorial of the Montana Legislature urging Congress to investigate the supply, control, allocation, and use of Missouri Basin waters and power (p. 12). And J. W. Grimes, chief engineer and executive officer, South Dakota Water Resources Commission, presented a statement of Gov. Ralph Herseth of South Dakota, whose first recommendation reads as follows:

"As Governor of the State of South Dakota, in the best interests of the people of the State, and so that South Dakota may make its proper contribution to the national economy:

"1. I urge then, that the Congress initiate an investigation of slack-water navigation on the lower Missouri River as a sound technique for water conservation" (p. 24).

Similarly A. S. Wendel, vice president of the Northwest Iowa Power Cooperative, and the Woodbury County Rural Electric Cooperative of Iowa, speaking also as vice president of the Midwest Electric Consumers Association, said:

"Finally, it must be admitted that there are many divergent views about the use and management of the Missouri River. These ideas involve navigation, flood control, recreation, irrigation, power generation, etc. It is only too obvious that the maximum of all these recognized benefits can only be obtained through the proper management of that precious resource—water. There is one method used on practically every other river in the country and has been the means by which the maximum of all benefits has been obtained. I refer to slack-water navi-

[2] There are other problems requiring solution before slack-water navigation may be considered feasible. Among them are sediment control, pollution abatement, seepage into valley land, and land inundation.

gation. We urge that authorization be granted for an immediate engineering study of slack-water navigation on the Missouri River" (p. 29).

Virgil T. Hanlon, manager of East River Power Cooperative of South Dakota, member of the Governor's Power Supply Committee, testified that 600,000 kilowatts of the Bureau of Reclamation generating capacity in the river was being left unfirmed and that, when firmed up, it would give preference customers more than 100 percent of their 1965 needs. The second of his seven recommendations, "2. Initiate a study of the feasibility of slack-water navigation."

The hearing record contains the "Summary Report on Operation of Missouri River Main Stem Reservoirs, 1958–59," by R. J. Pafford, Jr., Chief, Reservoir Control Center, U.S. Army Engineer Division, Missouri River, and a "Review by the Coordinating Committee on Missouri Main Stem Reservoir Operations" of testimony on this report at a public hearing. Both reveal the extent to which wasteful use of water to maintain open river navigation during 8 months of the year is creating problems in terms of other uses of the river, particularly power. The committee held that the suggestion that a solution could be found in slack-water navigation was beyond its responsibility (pp. 51–52).

The coordinating committee expresses its view "that both navigation and power are important primary functions of the main stem reservoirs, and that both functions, along with the others, are to be served equitably." It refers to the report of a special subcommittee of the Missouri River Interagency Committee indicating that, when the main stem reservoir system is completed, "operations completely ignoring navigation would produce power benefits only 2 to 10 percent greater than with multiple-purpose operations serving both functions." On this basis, it found "no economic justification for eliminating navigation service in the interest of power production" (p. 63).

The alternative is, of course, slack-water navigation which would both improve navigation and secure up to 10 percent greater power benefits from the presently authorized power projects, as well as the large block of additional power associated with a slack-water program for the lower river.

In the hearings, William E. Trommershausen, engineer of R. W. Beck Associates, employed by the Midwest Electric Consumers Association, testified:

"In our 1957 report to this committee, we pointed out that the firming up of Federal hydropower by thermal power in the Missouri Basin required a comprehensive study, and that such a study should be the responsibility of the Federal Government, with cooperation from preference customers and others as required" (p. 94).

Reference to the Senate Interior Committee's 1957 hearings on "Missouri Basin Water Problems," finds this witness stating:

"It is my conviction that power marketing studies may show that the ultimate capacity of the Federal hydro system in the Missouri Basin will eventually find its greatest use and value when used as peaking capacity for an integrated regional power network owned and operated by the Federal Government, cooperatives, municipalities, power districts, and the private utilities" (pp. 200–201).

Full use of these Missouri River projects for peakload, in conjunction with large modern steam generating stations carrying baseloads, could be greatly facilitated if operation of valuable reservoir space was not largely determined by the requirements of heavy summer releases of water for openflow navigation below Yankton, S. Dak. This emphasizes the extent to which provision for slack-water navigation in this lower river may be found to support great gains for the people of the basin.

A comprehensive survey of the feasibility of a slack-water navigation program for the lower Missouri River will take such possibilities into account. It may provide the basis for multiplying several times over the hydroelectric capacity which the region can ultimately obtain from this river.

In this connection, it should be noted that the great progress in large-scale fuel plant technology is not rendering hydroelectric development out of date, nor will its importance be undermined by the early achievement of competitive atomic power. Quite the contrary, great thermal stations will operate most economically on the base or intermediate portions of the load, with hydroelectric plants, including pumped storage projects, assigned to serving peak loads and portions of the base.

The importance of such use of the hydroelectric power available from the Missouri Basin program was emphasized in a paper delivered by E. Robert de Luccia, then Chief of the Federal Power Commission Bureau of Power, before

the Midwest Power Conference in 1947 at Chicago. His subject was "Coordi- of developing slack-water navigation, if the silt and river stabilization problems After discussing the possibilities of the present Missouri Basin program, and presenting charts to illustrate the use of hydro in conjunction with steam-generated power, he emphasized the special value of hydro as follows:

"Hydroelectric units are well adapted to supply the varying load demands because they have the ability to start from standstill and synchronize with the load in a small fraction of the time required for steam units. Capacity in addition to that represented on these curves must be kept in readiness to provide against emergency outages of equipment. The hydroelectric units with their quick-starting characteristics will provide a high degree of standby readiness for such emergencies.

"With hydroelectric units carrying the peak portion of the load, the fuel-electric plants can be scheduled to operate at best efficiency to carry block loads for several hours each day or to supply baseloads. Such operation would save the banking of extra boilers which is required if steam-electric units are kept in readiness to operate on short notice for supplying unexpected load increases or to carry load during emergency outages of equipment" (p. 15).

CHIEF OF ARMY ENGINEERS SUPPLEMENTARY MEMO TO SENATE INTERIOR COMMITTEE SUGGESTS FURTHER SLACK-WATER STUDY

At the request of Chairman Murray of the Senate Committee on Interior and Insular Affairs, the Chief of Army Engineers submitted further comments on previous testimony at joint hearings of the Interior and Public Works Committees held in May 1957 on Missouri Basin water problems. Enclosure No. 5, contained Corps of Engineers comments on slack-water navigation, Missouri River, Sioux City, Iowa, to the mouth (hearings, pp. 439–442).

The Corps of Engineers memorandum makes it clear that previous studies of slack-water navigation in this reach of the river were undertaken during the preparation of the 308 report on the Missouri River (published as H. Doc. No. 238, 73d Cong. 2d sess. in 1934) and are now out of date. It concludes with the suggestion that "in view of major physical and economic changes in the Missouri River Basin since prior studies of this type of improvement, it might be desirable to undertake an investigation of preliminary examination scope so that authoritative and up-to-date data on costs and benefits will be available." It estimated the cost of such an investigtaion at between $100,000 and $200,000, with between 2 and 3 years required for its completion.

Dealing with physical and economic changes since completion of prior studies, the memorandum states that the Missouri Basin program as it has developed since the 1932 report is steadily reducing the problems of floods, sediment, and bank stabilization which were previously obstacles to a slack-water program. Offsetting these gains, it sees resulting improvement of flood-plain properties as increasing the cost of acquiring lands which would be inundated. But the memorandum stresses particularly the fact that "estimated future power demands are of a magnitude totally unforeseen at the time of earlier studies, with the result that the possibility of incorporation of power production into a slack-water navigation project should not be neglected in future studies."

The memorandum recognizes that construction costs have increased greatly since prior studies, but adds, "there have been major advancements in construction methods, tools, and materials which should make possible certain economies in spite of the general price rise." This, and other parts of the memorandum indicate that, while approaching the possibilities of slack-water navigation with a caution which tends to emphasize the obstacles, the Corps of Engineers feels that a new study should be undertaken.

RECENT STATEMENT OF DIVISION ENGINEER CONFIRMS DESIRABILITY OF STUDY

On April 14, 1959, the Missouri Basin Interagency Committee, meeting at Council Bluffs, Iowa, adopted a resolution requesting the Corps of Engineers to undertake such a study. The committee includes representatives of the Federal departments and agencies concerned with river basin problems as well as of the Governors of the States which share the basin. At the committee's June 10, 1959, meeting in Douglas, Wyo., Maj. Gen. Keith R. Barney, U.S. Army Division Engineer for the Missouri River, responded in a paper which confirms the conclusion that a restudy of the possibilities of a slack-water navigation would be constructive.

He said that any future studies should be initially of preliminary examination scope. But he added that "they should be in sufficient detail to provide reasonably firm answers concerning practicability, cost, and economic justification." He suggested the possibility of a program combining high dams and low dams, depending on cost of flowage damages, as a possible answer. He said:

"Layout and design of structures would be of major importance. Since economical power installations would require dams of substantial head and since such dams would cause inundation of large areas of fertile bottomland, comparative studies should be made of higher dams capable of power development but causing more land inundation and lower dams not permitting power development but holding land inundation to a minimum. Possibly, a combination of the two types might prove practicable, the lower dams to be used where flowage damages would be particularly high and the higher dams to be used where returns from power production would warrant the increased flowage damages."

General Barney then outlines the nature of the study required and estimates that such an investigation would cost $200,000 to $300,000 and require 3 to 4 years for completion. He points out that the Corps of Engineers will need authorization and appropriation by Congress to undertake the study and concludes:

"If the necessary authority and funds are provided, the Corps of Engineers will undertake the investigation. There can be no assurance now that the results of the investigation would be favorable to undertaking a project for slack-water navigation. The study, however, would make it possible to obtain authoritative information concerning the cost and economic justification of such a project. Accordingly, the investigation would be of value even if the results should turn out to be unfavorable."

GENERAL CONCLUSIONS

Clearly, in the light of the facts set forth above, a survey of the possibilities of adding slack-water navigation and power development in the lower river to the comprehensive Missouri Basin program should be promptly undertaken. It offers both upper and lower basin States the opportunity to eliminate conflicts over use of water by assuring the fullest multiple-purpose use of all parts of the river and its tributaries.

Water is a priceless asset to any civilization. The importance of conservation and use of this asset will rapidly increase as the country's population pushes toward projected 200 million and 300 million levels. To fully serve our needs, a program for development of this or any other river must meet the challenge to make the greatest possible use of the basin runoff for all purposes before it flows to the sea.

Senator CASE. I wonder, Mr. Chairman, if we ought not to introduce Mr. Schad?

The CHAIRMAN. Yes, both he and the others.

Senator CASE. Ted Schad is the staff director for the Select Committee on National Water Resources. Mr. Schad is a research specialist originally, I believe, with the Library of Congress but loaned to the committee for special work in connection with this study, and formerly with the Bureau of Reclamation.

Ted, I wonder if you would like to introduce the boys who came with you working on the staff?

Mr. SCHAD. Of course our chief clerk for the committee is Paul McBride. You have seen him around. And Mr. Dickinson is helping us out. He has already been mentioned. He is with Senator Engle. We also have an expert here from the Public Works Committee staff, Johnnie Mutz. He is our expert on the rivers, harbors, and flood control projects.

Of course you all know Harold Schuler, who has really handled this end of the job for us for Senator Case, who had taken charge of preparing this hearing and the one tomorrow.

Now, also back here is Muriel Ferris, who is the assistant to Senator Hart, who has been with us out on this trip.

And Dean Eberle, also on the Public Works Committee staff, who has been handling some of the work out here.

And Ada Lenz, doing the secretarial work for the committee as well as for Senator Kerr on this trip.

And I believe that that is the limit of our staff here. We do have a few others that are off on other work now.

I think that just about covers it.

It is a pleasure for all of us to be here in South Dakota and we appreciate the hospitality which has been shown us on every hand.

Senator CASE. Mr. Chairman, I have to confess that I made a mistake here sometime back. I was looking ahead on the list and I checked off one name as having appeared. I got the check in the wrong place. We have with us Allen F. Agnew, who is State geologist of the State Geological Survey at Vermillion. I made a check by his name instead of another name here and overlooked calling on him.

Mr. Agnew?

The CHAIRMAN. Before he gets here, Senator Case, I would like to say this has been one of the finest hearings we have had. It is very encouraging to this committee to get the response from the people that we have gotten here. Our sole desire is to add to the information that has been accumulated, digest that which was previously accumulated, and coordinate that which we receive with it, in order that the Members of Congress will be better informed as to how to be of greater service. Your people here made great contribution in that regard, Senator.

Senator CASE. We appreciate that statement by the chairman of the committee, I am sure. I want to express my personal appreciation to all the members of the State as well as to the Huron Chamber of Commerce and the mayor and people locally. Also to Dean Eberle and Harold Schuler of my own office, who contacted many of the witnesses and has been responsible for some of the local arrangements.

Mr. Agnew, my apologies to you. I inadvertently checked your name here just as watching the checks. And I looked that over and notice you have not appeared.

The CHAIRMAN. Senator, I must say this situation developed one to the benefit of the witness because now we are going to be more attentive to what he has to say to us than we would have had he just been one of the middle ones that appeared before us.

STATEMENT OF ALLEN F. AGNEW, STATE GEOLOGIST

Mr. AGNEW. Thank you, very much.

Senator Case, Senator Kerr, Senator Hart, I would like to read the prepared memorandum that I have here before me and then speak briefly on the report that accompanies the memorandum.

The subject is ground water in South Dakota, our estimated requirements and our supplies.

The United States is not short of water. The average yearly precipitation for the Nation as a whole is about 30 inches. About 70 percent of this water returns to the atmosphere by natural evaporation and transpiration. The remaining 30 percent is the supply that is theoretically manageable. However, only a third of this manageable supply is actually withdrawn from the streams and from the ground.

Out of this one-third (or 3 inches), 1 inch is consumed by evaporation and transpiration, and 2 inches is returned to the streams and thus reaches the ocean. Thus, the total amount that finally escapes to the ocean is 8 inches, which is nearly 90 percent of the manageable supply.

The water-use situation is equally interesting. Industrial and irrigation uses are about equal; however, 60 percent of the irrigation water is consumed, while only 2 percent of the industrial water is consumed. Ten percent of all public water used is consumed. Irrigation and industrial use accounts for 80 to 90 percent of all water that is used artificially.

Considering the United States as a whole, the water problem cannot be a problem of total quantity of water, because we withdraw only one-third of the manageable supply and consume only one-tenth of it. Therefore, the national problem must be one of water management and water use. Water management concerns those who make decisions about water, as well as those who carry out a plan of action for water development, use, or conservation. The State Geological Survey is not a manager, but the managers are the people such as the State Water Resources Commission, who prescribe action or take action by legislation, by use of other authority, by application of rules, and by legal decision.

Organized emphasis on water and water planning has begun in several States, including Texas and California. In recent years the Congress has strongly emphasized planned water development.

Current predictions indicate that the national withdrawal of water by 1980 will be double the withdrawal in 1955. Withdrawals and artificial consumptive use could be doubled and still remain well within the national average manageable supply. However, water withdrawal could not be doubled in all parts of the United States except by a complicated and excessively costly system of regional transfers of water from basin to basin. For example, in some parts of the Southwestern United States water use may have to be reduced within the next generation because stored reserves of ground water will not last indefinitely.

On the whole, however, the national water withdrawal pattern is very wasteful, and forecasts about the future should be gloomy only if they assume that such wastefulness will continue. Records of water use, however, make it obvious that much of the prospective increase in water demand could be met simply by more efficient use of the water that is being withdrawn. Increased demand already has been met by improved efficiency of use and reuse in several plants in the steel industry. It has been met by public supply systems where waste water is reclaimed and reused. Another good illustration is the petroleum industry, with which Senator Kerr is very familiar. About 41 barrels of water must be circulated to process 1 barrel of crude oil. In some plants the circulation consists of 100-percent new water. For the petroleum industry as a whole, about 27 percent is new water. However, where short supply forces conservation and reuse, only about 5 percent is new water.

Most uses of water, except for power generation, damage quality—they raise the temperature, alter the chemical nature, add to the suspended sediment load, or all three. Industrial chemical waste, sewage and other organic contaminants, salt leached from the soil in

irrigated areas, sediment produced in areas where man has disturbed the cover of vegetation, all depreciate the quality and the usability of water. This problem is beginning to loom larger all the time. Many of the Nation's streams, including some large ones, already are little better than open sewers. An unfavorable salt balance is evident in some irrigated areas of the Western United States, et cetera. These kinds of problems have been widely publicized. Many of them can be overcome by control of wastes and by water treatment. That is, quality control can be improved by liberal application of technology and money, and by leaving enough water in streams to dilute the unavoidable waste.

In other words, control of the quality of water also is a problem of management. The quality of stream waters will be as bad as management permits it to become, or as good as management demands that it shall be.

From a beginning that dates back to the 1930's, and by concentrated activity in the last 10 years or so, the State geological survey has put a large share of its effort into collecting basic data on water, and working on both long-range and short-range problems. As you are well aware, water was taken for granted, and there was little public support for a program with long-range, broad objectives until very recently.

Significant water problems developed in the United States during the drought years of the 1930's. Thereafter, World War II created a sudden demand for expansion of many water developments, and for new supplies for a large number of defense industries, for military installations, and for the enlarged operations of governmental agencies, especially in the Federal Government. It is fortunate, indeed, that World War II occurred during a climatic wet period; had the war years been at a time of drought, economic distress in the Nation would have been magnified.

In the decade following the war, the importance of long-range water planning became widely recognized. A large number of State and Federal Government agencies, commissions, and advisory committees, citizens' groups, and professional societies made many studies. In short, the need for intensified and systematic water programing and projects is now generally and widely recognized. Considerable ground remains to be covered, however, before it is recognized that, with a mobile, annually renewable resource which is controlled by natural laws, sound programing and planning requires a broad base of scientific support.

The kinds of data and scientific information that are needed for water development can be gotten only at considerable expense. Knowledge is costly, but it is cheap compared to the cost of ignorance, and because it can eliminate the high cost of guesswork in the construction of projects.

The purpose of the State geological survey, by basic policy and the traditions of the nearly 70 years of public service, is scientific. In our water resources program we collect basic data as the raw materials with which to do our work; we analyze and interpret the data and express their meanings in water-supply appraisals; we determine and analyze the processes and factors that control water in natural and artificial environments, and we express these factors in terms of scien-

tific principles; and we publish this information. The work of the State geological survey with water, in short, provides a scientific basis for water management, such as is carried out by the State water resources commission. In the case of specific developments, it provides the scientific means for determining the consequences of management actions that have been taken, for predicting the consequences of actions that may be taken, and for choosing between alternate actions.

In summary, then, sufficient water is available for present needs and for a very large increase in use. Too much water has been wastefully and shortsightedly used in the past, but conservation and farsighted scientific management are essential. Nature distributes water poorly, for our purposes, but enough water is available so that artificial redistribution can meet many local problems. The basic problem is economic: what can we afford to spend? New development costs could be reduced by more efficient use of supplies that are already available. A most important problem during the near future will be that of improving control of the chemical quality and suspended sediment in water, for all purposes.

Where do the functions of the State geological survey fit into this picture of the future? A good development program and a plan of action must be based on scientific evidence of how much water is available, where it is available, and what kind of water it is. We propose to continue to obtain this kind of information and to translate it into terms that are useful to water managers.

I would like to give the highlights in about 3 or 4 minutes from this report which I have before me, if it is your pleasure, so I call on one of my men to use the map up there, Senator, please.

Would Mr. Tipton please come forward? It is the map that has the patterns on the outside that show the artesian water areas of the State, that one right there, that Mr. Grimes used. (See map on p. 968.)

While he is getting adjusted there, the summarization: In 1955, South Dakota used an average of 243 million gallons of water per day, of which 76 percent or 185 million gallons was derived from ground water. This was the highest ratio of ground water use to total water use of any State. This means that South Dakota has had to rely heavily on wells for its water supply. It is this ground water supply with which the State Geological Survey is concerned, because a knowledge of the geology of the formations from which this ground water is obtained will be a tremendous aid in developing future water supplies in South Dakota.

The depths to this ground water and the formations from which it is obtained vary considerably in different parts of the State. There is a natural division between shallow and deep ground water, and between the eastern glaciated part of the State and the western nonglaciated part of the State.

That part of South Dakota east of the Missouri River is covered by glacial deposits which vary from a thin veneer to more than 700 feet thick; it is these glacial deposits that provide almost all of the shallow ground water in eastern South Dakota. The only other sources of shallow ground water in this part of the State are the recent alluvial deposits (table 1) along the major rivers and their tributaries, the ancient river channels buried beneath the glacial deposits, and the bedrock.

TABLE 1.—*Stratigraphic systems present in South Dakota*

TIME ROCK CHART

Group	System	Formation or rock type
Cenozoic	Recent	Alluvium.
	Quaternary	Glacial stream and wind deposits.
	Tertiary	Sands, silts, clays.
Mesozoic	Cretaceous	Hell Creek.
		Fox Hills.
		Pierre.
		Niobrara.
		Carlile.
		Greenhorn.
		Graneros.
		Fall River.
		Fuson.
		Lakota.
	Jurrassic	Morrison.
		Sundance.
Paleozoic	Pennsylvanian	Minnelusa.
	Mississippian	Madison.
	Devonian	Limestones and dolomites.
	Silurian	Do.
	Ordovician	Do.
	Cambrian	Sandstone and shale.
Precambrian	Precambrian	Sioux quartzite and granite.

For you gentlemen who have copies of this report, the figures are in the back of the report and can be referred to there.

Speaking briefly about shallow ground water, that part of South Dakota east of the Missouri River is covered by glacial deposits that vary. The shallow ground water obtained from the glacial deposits generally comes either from small sand leases in the glacial debris, or from large sand and gravel plains called outwash deposits. The sand leases do not provide large quantities of water, but most of them are capable of producing enough for individual farm needs. These sand leases usually vary to such a degree that their size, shape, extent, and depth cannot be outlined accurately without drill hole or geophysical information.

The outwash plains, except where they are thin, provide large quantities of water, in many places enough to irrigate or enough for municipal supplies. These outwash plains occur at the surface and range up to 100 feet in thickness. In contrast to the sand leases, they have a characteristic surface expression and therefore can be outlined very accurately. The State geological survey has mapped many such plains in several parts of eastern South Dakota in the past few years, and has found them to have great potential value for future water development. The only outwash plain that has been exploited to any great degree as yet is the Parker-Centerville Plain along the Vermillion River in Turner County, where more than 70 irrigation wells are now pumping. However, there are many more undeveloped plains in South Dakota which contain enough water for irrigation, industrial or municipal uses, or recreational use. These include the Big Sioux Valley Plain along the eastern border of South Dakota, the Missouri River Plain, the Vermillion River Plain from Turner County southward to the Missouri River Plain; and several other outwash plains not associated with major rivers. All of the outwash plains shown in figure 2 are large; not included are innumerable small ones, too small for the scale of the map. Most of the outwash plains shown in figure 2 have not as yet been investigated in detail,

so their potential value is not accurately known. But, as an example, three that have already been mapped—the Parker-Centerville outwash, the Big Sioux Valley outwash, and the Missouri Valley outwash in the Yankton-North Sioux City area—show a supply of approximately 2,000 billion gallons of water, enough to supply the whole State for 27 years at the rate of use during 1955.

Recent alluvium is also a source of shallow ground water in eastern South Dakota, but usually does not provide the quantities needed for more than individual farm wells. These alluvial deposits are found along rivers, streams, and creeks.

The buried channels of ancient (preglacial) rivers are another source of shallow ground water, and some of them could produce large quantities of water. However, these deposits have not yet been studied in detail in South Dakota; nevertheless, they should be included in any future water development program.

Bedrock, where it is close to the surface, is another source of shallow ground water in eastern South Dakota, but owing to the usually thick cover of glacial deposits, shallow water from this source has been developed in only a few places. The Sioux quartzite is locally used as a source of shallow water in Davison, Hanson, McCook, and Minnehaha Counties, although it does not provide large quantities. The Niobrara chalk also provides shallow ground water where it is near the surface in southeastern South Dakota.

In general, shallow water supplies are difficult to obtain in western South Dakota, and are not a major source of water in that part of the State. The only shallow sources of water in western South Dakota are in alluvial plains and terraces, and surface bedrock formations. Except along streams, the surface of western South Dakota is composed of bedrock, and about half of this bedrock is Pierre shale. The Pierre shale itself is not a good source of water and consequently most of the ground water in the Pierre shale area is derived from deep sources.

The alluvial plains and terraces along the major rivers and their tributaries provide enough water for individual farms, and in places could produce large quantities of water. They are such small areas that they do not constitute a major source of water in this part of the State.

Some bedrock formations, where composed of sand, provide good sources for shallow ground water. In the northwestern part of the State the Fox Hills sandstone provides a shallow source of good water, locally in large quantities. Similarly, the Hell Creek formation in this northwestern area has some sand zones which provide shallow water for farm use. The Tertiary sands in the south central and southwestern part of the State also provide good sources for shallow water. In the Black Hills area the bedrock limestones and sandstones, where near the surface, provide good sources of shallow water. Generally, however, alluvial sources are used for ground water supplies, especially where the granite crops out in the central part of the hills.

Owing to the small amount of rainfall in the western part of the State, and to the limited supply from shallow sources, water is a very scarce and highly prized commodity which deserves the study of all agencies related to finding water supplies.

Let's talk about the deep ground water briefly. The Dakota sandstone is the aquifer we are all familiar with. Although the various sandstones called Dakota have lost much of their artesian head in the last 50 years, many places in the State still have flowing wells from this source, as is shown in the white area on the map.

Any future water development should include a conservation program of plugging the "wild" flowing artesian wells. These "wild" wells have reduced the piezometric head of the flows tremendously since the artesian formations were first tapped. As an example, the artesian pressure at Woonsocket dropped from 250 pounds per square inch in 1890 to less than 25 pounds in 1950. The plugging of the "wild" wells will greatly curtail this rapid decrease in pressure, and will stop a needless waste of water, which tends to reduce this pressure. Other sources of deep rock water are given in the report. But I would like to move to the summary statement.

Of the rock units discussed, several have been important sources of water over the years, although most of them contain highly mineralized water. Probably the most important and best known of these is the Dakota sandstone series; nearly all the deep artesian wells in the State have their source in these sandstones. Second in importance is the Fox Hills formation especially where it is at or near the surface. The Fox Hill yields adequate supplies of high quality water both for domestic and industrial use. The Codell sand is an important source of relatively shallow artesian water of good quality in southeastern South Dakota. The Sundance and Minnelusa formation also provides large volumes of water that is rather high in mineral content, in both central South Dakota and the Black Hills area.

Waters from the other rock units discussed are also likely to be high in mineral content.

The plans for the South Dakota State Geological Survey in the next 20 years call for a large amount of geologic mapping of ground water resources. Many sources of ground water in South Dakota have not yet been studied either geologically or hydrologically, and it is the plan of this department to study as many of these sources, in cooperation with the State water resources commission, as budgetary limitations will permit. Presently, approximately 40 percent of the annual budget of the State geological survey is being spent on studies of ground water. In addition, the 1959 State legislature appropriated $10,000 per year, which is now being matched by the Federal Government, to the State geological survey for cooperative investigations with the U.S. Geological Survey of specific ground water problems in South Dakota.

Certain glacial deposits in the eastern South Dakota area are good water sources and need to be studied further, as they have the potential to provide much of the future water needed in this part of the State. The western part of the State badly needs an up-to-date artesian water study much like those that have been carried out recently in the eastern part of South Dakota by the State geological survey (Barkley, 1952 and 1953; Erickson, 1954 and 1955).

In addition to the general studies referred to above, many of the water supply problems in South Dakota are local in nature and must be studied individually, because of the locally different and complex

problems involved. Many such studies of the geology of local ground water problems have been published by the State geological survey.

It has been shown that water problems already exist in South Dakota, and undoubtedly will become more acute in the future. Most of these problems will be readily solved by a proper study of the geology and hydrology of the ground water resources. Agencies such as the State geological survey should have substantially increased budgets so that they can devote increased effort to the study of their specific phases of the program.

If this accelerated program of study is carried out, most of the immediate needs of South Dakota will be provided for, and many of the future water problems will be solved.

Thank you.

Senator CASE. Mr. Agnew, the remarks you have been making here recently, I note, are sort of a condensation of this report entitled, "South Dakota's Ground Water Needs and Supplies," which you and Merlin Tipton and Fred V. Steece prepared. It seems to be dated September 25, 1959.

Mr. AGNEW. Yes, sir.

Senator CASE. This is the first time I had a chance to see this. It occurs to me that this would be very useful for reference by anyone who wants to study South Dakota water problems. There are several charts and maps in here in addition to the text. Is this available for general distribution?

Mr. AGNEW. It is not yet but we plan to make it available, sir.

Senator CASE. Request for it could be addressed to you at Vermillion?

Mr. AGNEW. Yes.

Senator CASE. The office of the State geologist?

Mr. AGNEW. Yes, sir.

Senator CASE. We want to thank you for the statement and summary on the study that has been made.

If that concludes our witnesses, the committee is ready to adjourn the Huron hearing.

If there is nothing further the hearing stands adjourned.

(Whereupon, at 3:15 p.m., Tuesday, October 27, 1959, the hearing was adjourned.)

WATER RESOURCES

WEDNESDAY, OCTOBER 28, 1959

U.S. SENATE,
SELECT COMMITTEE ON NATIONAL WATER RESOURCES,
Sioux Falls, S. Dak.

The select committee met at 9:45 a.m., pursuant to S. Res. 48, in the auditorium, Washington High School, Sioux Falls, S. Dak., Senator Robert S. Kerr (chairman) presiding.

Present: Senators Kerr, Case, and Hart.

Present also: Theodore M. Schad, staff director of the select committee and Paul McBride, chief clerk.

The CHAIRMAN. The committee is very happy to be in Sioux Falls today, in the State of one of the distinguished members of this committee and one of the most distinguished members of the Senate, Senator Francis Case, who has long been a leader in the field of water resource development.

This committee had a very wonderful hearing yesterday at Huron. We listened to many people of South Dakota present information pertinent to the objectives of these committee hearings.

We feel that our country is entering a stage of phenomenal growth, both populationwise and industrial and agricultural productionwise.

We are aware of the fact that in many areas water is available but lack of conservation and control prevents its beneficial use. In some areas water is definitely scarce. In other areas water is abundant, with some to spare. And in all areas floods are too often permitted to occur, doing great damage. The water is moved away from the areas where it would be most valuable, having taken its toll in human life and property damage.

In looking forward, it is our belief that more aggressive measures must be taken to better conserve, capture, and utilize this water.

We are going to have an increasing population, and it seems definite that we are, of 3 to 4 million a year. If our industrial and agricultural production is to be increased proportionately as our population grows, if our standards of living increase and our per capita requirements are to be greater, then we must make plans to insure that one of the greatest of our natural resources, which is our water, is available in the areas where needed to make this growth possible.

We seek to determine what the needs will be in 1980, where they will be, and how best to make the water available to meet those needs.

We have with us today one of our fine members, who is from Michigan, Senator Phil Hart.

The work of this committee is exemplified by the fact that its chairman is from Oklahoma, in the Southwest; and of the two members here today, one from the semiarid State of South Dakota, Senator

Case, and the other from a great industrial State that has been regarded as having an abundance of water, Michigan. But as we go into these matters we find that all three States have something in common with the rest of the country, whether it is an agricultural area, industrial area, or both that is a common ground in that the problem of abating pollution, conserving more water, having available water for growth and development. This is common to every State in the Union.

We are happy to be here and as is our custom we will hear first from your senior Senator who is a member of this committee, Senator Case, and then he will call the witnesses to give their statements to the committee.

Senator Case.

STATEMENT BY HON. FRANCIS CASE, U.S. SENATOR FROM THE STATE OF SOUTH DAKOTA

Senator CASE. Thank you very much, Mr. Chairman.

Let me just speak a few words briefly.

First, to say that it is a pleasure to me to have this committee meet in South Dakota and particularly to have you, Mr. Chairman, with your many interests in South Dakota come here in an official capacity.

I say "as many interests in South Dakota" because Senator Kerr is not in South Dakota for the first time. He has been here in other years, hunting pheasant, buying cattle and drilling oil wells, and I suppose has invested more money in South Dakota than a great many of us who have lived here. Senator Kerr said to me the other day that he still expects to see South Dakota become one of the great oil-producing States of the Union. But he has found dividends, I think, in South Dakota Black Angus cattle. In spite of the fact that I am giving a little plug for Black Angus here, knowing that the Governor and he both have some things in common there, I happen to be a Hereford raiser, but I am glad to know that he recognizes that we can raise good cattle in South Dakota as well as pheasant.

It is a pleasure also to have Senator Hart here, who was Lieutenant Governor of Michigan before he came to the Senate. This may be his first visit to the State—is it, Phil?

Senator HART. Yes, sir.

Senator CASE. But he has spoken enthusiastically about the hospitality he found over at Huron and Redfield yesterday and the presentations that were made.

It is not necessary for me to emphasize for this group our interest in water in South Dakota. I am merely glad that we are included in the survey which this select committee is making of water problems throughout the United States.

The committee has representatives from the major committees of the Senate which deal with water problems. We are charged with the matter of studying the situation throughout the several States and trying to come up with some recommendations for a national water policy.

Our use of water, as the chairman has indicated, is increasing and it is not merely a matter of developing new water supplies, but a better use of what we have.

So we brought this hearing to Sioux Falls today because we had some communications from the city officials indicating that they felt there was a problem here they would like to present. We had a great many witnesses at Huron yesterday. The general situation of the State was pretty well covered. Joe Grimes represented the Governor and he is also the water resources commissioner.

First, today, we will call on the mayor, who is the host, for a few words of welcome and he will be followed by the first general witness, the Governor of the State, Mr. Herseth.

Mayor?

STATEMENT OF FAY WHEELDON, MAYOR OF THE CITY OF SIOUX FALLS

Mr. WHEELDON. Thank you, Senator Case.

Governor Herseth, Senator Case, Senator Kerr and Senator Hart, on behalf of the city of Sioux Falls I would like to extend the official greeting to each one of you gentlemen and, of course, to the audience and the witnesses who are here today.

We are very grateful indeed for the opportunity to present to you some of our problems and I trust that we will do so in a manner so that they may be usable to you and your committee.

I would like to extend my own personal good wishes to each and every one of you and hope that our meeting here today is a complete success. Of course, if there is anything later that the city of Sioux Falls may do to be helpful to your committee, please feel free to call upon us.

Again, good luck with your hearing. Thank you.

Senator CASE. Thank you very much, Mayor Wheeldon. We appreciate your kind words of welcome.

Now we will call on Governor Ralph Herseth, Governor of the State of South Dakota, for such statement as he cares to make.

STATEMENT OF HON. RALPH HERSETH, GOVERNOR OF THE STATE OF SOUTH DAKOTA

Governor HERSETH. Thank you, Mayor, for that word of welcome and I would like also to add to that a word of welcome from the Governor from the great State of South Dakota to everyone who is present.

Senator Case, Senator Kerr, and Senator Hart; I am very grateful for your presence on this occasion. I am the Governor of South Dakota, Ralph Herseth, and I do appreciate very much the opportunity to appear before this select committee concerning water resources development in South Dakota.

I would make at the outset an observation that we are especially honored in South Dakota, I believe, because of the fact that this committee has seen fit to honor us with their presence two times since January 6, 1959.

On this particular visit we are especially grateful because of the fact that you have seen fit, Senators, to schedule your hearings in two of our leading cities of the State of South Dakota.

I would also observe that today is especially significant that we are having this hearing here because of the fact that this afternoon at 2:30 p.m. there will be some outstanding ceremonies on the site of the Oahe Dam just north of Pierre. I am expected to be present at that time. It is more or less a finalization act to some extent, inasmuch as the last shovelful of dirt is at that time going to be placed in position on that particular structure.

The second reason that I think it is very significant that we are meeting for this purpose today is because of the fact that we do have a distinguished and outstanding U.S. Senator as chairman of this select committee. I say that in all sincerity and I also say it with a certain amount of humor because of the fact that he has accomplished the almost unbelievable feat of mixing water and oil to his own advantage and to the advantage of his fellow citizens, and I think eventually to the advantage of all of us in South Dakota here.

We appreciate the fact very much that he has the confidence and the wherewithal so far as knowledge and ability is concerned to spend some of his energy and invest some of his wealth in this State of South Dakota. I think that is also something of great significance.

We are especially in a mood to welcome people on this occasion because—and I might also repeat something that Senator Kerr stated before the joint sessions of the house and senate in our legislature last January when he was here. He said at that time that he expected in the future that perhaps in his State of Oklahoma, water will be as significant and as important so far as wealth to the State is concerned as oil itself has been over the years.

If we can look forward with an optimistic view such as he has, perhaps we could almost go as far as to say that in South Dakota water and oil will be probably nearly as important and great to our citizens as it has been and is going to be to the people of Oklahoma.

I certainly hope that you will stay in our State of South Dakota as long as your busy schedules will permit. To the Senator from Michigan making his first visit here, we are most anxious to make a good impression on you so far as our hospitality is concerned and our State itself.

By letter under date of June 23, 1959, my good friend, and as Francis Case has mentioned, also fellow Angus cattleman, Chairman Bob Kerr, requested information from me concerning water problems and water needs in South Dakota and the experiences and plans for water resource development which we may have. You wished to have this information on a current basis and projected to the year of 1980. I would like to submit this report to you at this time and I have it here at my right hand and will immediately after my presentation deliver it to you in person, Senator Kerr.

Senator CASE. Governor, could I interrupt just a moment?

Governor HERSETH. Yes, sir.

Senator CASE. Our high school visitors, I see, are leaving with the bell. I want to assure them that we were glad to have them here, and if they or other students have an opportunity to visit us again during the hearing they are most welcome.

Thank you.

Governor HERSETH. I appreciate that comment very much, Senator.

This summary and supporting data is a combined effort of the interested State agencies.

I might observe also, Senator Kerr, at this time that in your request you mentioned something, I believe, about limiting the report to about 10 pages, and those of you who can see this probably feel that we have exaggerated a little bit or gone beyond the limitations which you set forth. I think that the report itself is limited to 10 pages. There are some supporting brochures and maps and other illustrations contained in this booklet and that is why it seems to be probably more elaborate than you had expected.

A copy of my paper which I shall present this morning is also here at my right hand and will be distributed to those people interested in having it. I wish to say, however, I would have distributed it prior to my appearance here had it not been for the fact that there are some slight changes in the form that I am using which I made at the last moment en route here this morning by plane from Pierre.

Deep artesian ground waters underlie nearly the entire area of South Dakota. These sources have been developed extensively for domestic, municipal, and stock water supplies. Lacking other waters, these deep aquifers have been overdeveloped during the past 60 years. Considerable artesian pressure has been lost, but the universal distribution of these deep ground waters constitutes a very valuable water resource. The water is salty. It is unfit for irrigation use except in the vicinity of the Black Hills. A bright ray of hope for treatment of these waters is the proposed establishment of a saline, brackish water desalting plant as authorized by Congress for locating in the northern Great Plains. I believe that this plant should be located in a South Dakota city.

Eastern South Dakota is blessed with interlocking glacial melt water channels which contain shallower ground water, within 200 feet of ground surface. These supplies are not yet fully developed. Since the inflows into these acquifers is dependent on precipitation in recharge areas, the State controls the withdrawal of water from these sources very carefully.

The general objective is to limit the average annual withdrawal of water to the average annual inflow quantities. These sources are used for domestic, municipal, stockwater, and irrigation supplies. During the past 4 years, about 50,000 acres of irrigation has been developed from these shallow ground water sources, through the use of pumping methods. The trend is continuing but development has definite upper limits. Development of other water resources in the State will provide opportunities for additional recharge of these ground water supplies and will permit greater withdrawals.

The real water supply problems in South Dakota stem from, first, scanty and extremely variable precipitation, and, second, poor distribution of surface runoff.

The only water resources development that can help the scanty precipitation problem is weather modification. This has been tried in South Dakota and commercial efforts were quite extensive this year. Results are not conclusive. Timing of precipitation during the growing season is an important factor also. During 1958, the grain crop was among the best on record in South Dakota. Precipitation was about three-fourths of average. During 1959 precipitation was below normal, to make somewhat of an understatement. Consequently we have had a rather disastrous crop this year. It has been

implemented and somewhat caused by the extreme lack of subsoil moisture and this of course, was due to an extremely dry fall, winter, and spring season following July 1 of 1958.

Our problem of water distribution can be corrected by waterworks construction. Which of such projects are most needed, is difficult to specify.

South Dakota is primarily an agricultural area. The future economy will be dependent upon agriculture for as many years as can be visualized at this time. Stabilization of our agriculture to the maximum extent possible should be our prime objective.

Our greatest agricultural income in South Dakota is derived from livestock. Variable feed supplies with associated extremes in feed prices are the greatest problems faced by our stock producer and our stockfeeder. Too often we have too much or too little. Our farm cash crop productive capacity, including the present surplus crops, is marginal to other areas in the United States and varies widely from year to year.

Conversion of undependable cash crop farm enterprises to stabilized livestock feed livestock feeding operation would solve many of our farmers' problems. Additional stabilized stock feed production would supplement stock feed supplies for other farmers' stock feeding operations, supplement and in many cases replace ranchers' stock feed supplies, increase the stock-carrying capacity of our grasslands, reduce the variation in stock feed prices and reduce the surplus crop situation insofar as this area is concerned.

These objectives can be accomplished by construction of proposed and potential irrigation projects. We can develop available local water supplies, primarily ground water. However, we are dependent on the Congress and the Federal Treasury to finance the investments in such projects for transmission of water from our only adequate water supply source, the Missouri River, to the places irrigation water can be used.

This reasoning leads me to state that irrigation projects are our most acute water resources development needs, now and in the future to 1980 and probably beyond. This position is further solidified in my mind by the inclusion of municipal, domestic, stockwater, ground water recharge, flood control, water recreation, fish and wildlife, low flow stream regulation, and other associated purposes in irrigation projects works. The coincidence of great and large-area water needs for these other purposes adjacent to and downstream from proposed irrigation projects makes possible and very desirable the planning of these irrigation project areas on a subbasin, multiple-purpose basis.

Now that I have mentioned multiple purpose I wish to digress a little. State of South Dakota representatives direct the attention of the people interested in the same water supply to water resources project studies, they direct the attention of these people to possibilities associated with project investigations. They testify before congressional committees to obtain authorization and planning money during the same years for each of the Federal agencies having jurisdiction for portions of the purposes.

They work with each of the Federal agencies to evaluate project possibilities in terms of coordinated multiple purposes.

I hesitate to criticize too strongly because State and local people could do a better job. But the efforts of these State representatives result in disappointment and frustration because each agency's planning reports too often cover only the purposes for which that agency is responsible.

The multiple-purpose planning should result in a multiple-purpose plan. In our experience such a plan is not the practice.

The Federal-local program of construction of stock water reservoirs in our stock-producing areas should be continued. More attention must be directed toward proper spacing, size, depth, and other physical characteristics of such structures. Water supplies are too critical to permit indiscriminate construction. Also, we are reaching a stage where overall water supply considerations require periodic application of evaporation retarding surfaces over these reservoirs.

Flood control on rivers and in watersheds should proceed as rapidly as possible. The river projects should be planned on a river basin basis even though stage construction may be necessary. The flood and soil erosion problem is most acute in the southern portion of the State.

Another very acute problem in South Dakota is closely associated with water resources development. This concerns our rural electric power supplies. Many of our rural people are utterly dependent upon the Federal power supply from the Missouri River dams.

Those who have received Federal power have not been refused power service to date. However, the power supply will probably be fully allocated in the power marketing area by 1965.

After that time there is no known additional power source to meet the power load growth in much of the rural area in this State. Nor are there economical means of constructing their own generating plants. Federal power marketing policies need reappraisal, taking into account a more uniform opportunity for all customers receiving power service to obtain long-term future load growth power at competitive prices among all customers and to eliminate possibilities for profits to preference customers in some areas at the expense without compensating service to preference customers in other areas.

It is our opinion that these undesirable relationships will occur under present policies. We believe, too, that more attention should be paid to maximum generation of firm power by the Missouri Basin main stem powerplants.

Solution to these acute problems, irrigation projects with flood control and with associated miscellaneous purposes, stock water supplies, flood control, including watershed projects, on multiple-purpose planning and development bases, and increased generation of firm power in existing and proposed Federal powerplants, are urgently needed as soon as planning, authorization, local organization, financing, and construction can be arranged.

Thank you very kindly for the opportunity to express these views concerning the water resources needs in South Dakota.

I might add extemporaneously that this is a composite of the thinking of several of our people on our water resources commission, our engineer and myself and those individuals from which I could drain information pertaining to this particular subject.

It is an honor for me to have this opportunity to make this presentation and I thank those of you who have been responsible for making it possible.

Senator CASE. Governor Herseth, it is an honor for us to have you make this comprehensive statement that you have this morning. There are two or three points that you brought up about which I may want to ask you a question. First, I should like to invite the chairman and Senator Hart to make any comment or ask any questions that they may desire.

The CHAIRMAN. I have no comment, except the Governor gave us a very fine statement and I am glad to have been here when he gave it.

Senator CASE. Senator Hart?

Governor, I was interested in the emphasis you placed on the development of power. It will be recalled, I think, that the initial survey resolution on which the Army Engineers held a hearing in Pierre in March 1940 was a resolution of the House committee on flood control which requested a study of the Missouri River with a view to the development of power in South Dakota.

So it is entirely appropriate to be reminded at this time that the purpose of power should not be neglected as we work out the multiple uses of the river.

We have a large map over there which is presented by the Army Engineers and made available by them. Anyone who looks at that must realize that the enclosure of the floodwaters in those big reservoirs in South Dakota does not give much flood protection to South Dakota. Actually it floods out a lot of land. Flood protection is for the areas downstream, primarily.

If we fail to get the power benefits that initiated the study back in 1940, that resulted in the Pick-Sloan plan and the Food Control Act authorization of 1944, we will lose a great deal. We feel that these power benefits must not be lost. I am glad in your statement you brought out the importance of that.

To date I would say, and I wonder whether you agree with me, that the principal advantage has been the benefit that has come by the extension of rural electrification and the recreational features.

Governor HERSETH. Have you finished your statement, Senator?

Senator CASE. Yes.

Governor HERSETH. I would very definitely concur in the contention that to date the greatest benefits have been in the area of power, especially for our rural people and our municipalities that are benefited at the present time. And I think also that it was very appropriate for you to bring this out after the statement that I have made. I would probably clarify my position just a little bit by saying that maybe I can rightfully be accused of being a little bit prejudiced so far as power is concerned because of the fact that I have waited patiently, I thought, for a few years before I was able to hook my farm onto rural electrification. I have said repeatedly on various occasions when I have been speaking before REA groups that it is one of the most progressive steps that we were ever able to take in the operation of my particular unit, and I feel that if it applies there it applies to all our rural people in South Dakota.

That is one of the reasons that I did not want to make this presentation without emphasizing, and I suppose you could call it reemphasizing, the importance of power to our people in South Dakota.

Senator CASE. I share with you that appreciation of what rural electricity means. In fact, we put in one of these heating units last year, so that in our home we are heated by electricity now, too.

Governor, the other big use that was held forth to South Dakota, if this water was apportioned in this State, was the possibility of its use for irrigation and possibly some municipal water supply. As Governor of the State, you have pointed out the value of possible irrigation. Do you have a feeling that we are progressing as rapidly as we ought to in the use of some of this water for irrigation?

Governor HERSETH. No. I cannot say that I am entirely satisfied with the progress that we have made there, Senator Case.

Referring to your statement, recreation and the use of power have come the fastest, the most rapidly. Since the enactment in 1959 of the conservancy district bill, I had expected that probably our people on the local level might have moved a little more rapidly in order to get organized for the ultimate and final use of this water for irrigation. Of course there are various estimates as to when we will have the quantities of water that we need for irrigation. Sometimes I am surprised at what the Army Engineers themselves tell me as to what their guess is as to when we will have the reservoir at Oahe, for instance, filled. Perhaps the organization on the local level for the use of the Missouri River water for irrigation purposes will meet the supply when we get it there. But I am very doubtful of that at the present time. It is one of the things I am hammering on, so to speak, in various communities at the present time to get a little more activation on the local level in order to get ready for this when the water is available.

Senator CASE. Thank you very much. If there is nothing further, won't you join us at the table, Governor?

Governor HERSETH. Yes, sir, I would be glad to. Thank you.

Senator CASE. The next witness we call on is Mr. John Browning, water commissioner for the city of Sioux Falls.

Mr. Browning.

STATEMENT OF JOHN N. BROWNING, WATER COMMISSIONER, CITY OF SIOUX FALLS

Mr. BROWNING. Mr. Chairman, Senator Kerr, Senator Case, Senator Hart, I sat in yesterday at your meeting in Huron and I appreciate the fact that you must listen to a great deal of repetition. I enjoyed that meeting very much and necessarily I must repeat some things that have been said before.

I appreciate the fact it is a good way to drive home the problem.

Water supply is no longer a local problem, one to be solved by each community or each farm for itself, but is rather a matter of concern to the entire State—and is now becoming a national problem.

To provide the necessities of life for our ever-increasing population the various uses of water will require a constant reappraisal by those in authority on a national level and this in the very near future.

If it can be assumed that the city of Sioux Falls will grow at least as rapidly as the predicted national average, then a 98,000 population by the year 1980 seems to be as reasonable and conservative as such estimates may be made.

During the past 20 years our average daily demand has more than doubled, from 4,416,000 gallons per day in 1939 to 9,800,000 in 1959. The increase in per capita consumption through the use of modern home appliances indicates that our average daily use will again double in the next 20 years.

The water for the municipal supply is obtained through wells from an underground aquifer consisting of assorted sands and gravels deposited in the ancient bed of the Big Sioux River. The aquifer is confined on the east and on the west by clay banks. The southern end is closed by a natural rock dam in the vicinity of the northern end of Covell Lake. Another rock dam near Baltic completely encloses the aquifer. The water-bearing materials are underlain with clay and ultimately with quartzite.

Water is supplied to the aquifer by direct precipitation on the uncovered sand and gravels and by seepage through the overlying soil into the sand and gravel strata. The Big Sioux River and county drainage ditch No. 1 serve the aquifer by taking water from the upper levels of the 5,100-square-mile watershed and conveying it to the aquifer. In this way the depleted areas are rapidly recharged so long as flow in either of these streams is maintained.

At the present time Sioux Falls has 27 active shallow wells in the Big Sioux River well field.

The State water resources board has accepted a daily withdrawal of 27 million gallons daily from our present faclities and have granted permits for another 30 million gallons daily between Sioux Falls and Baltic. In addition to this we have been granted permits to withdraw 10 million gallons daily from the Skink Creek area. Water rates have been adjusted and a survey has been completed to progressively take advantage of these permits as needed.

The Army Engineers are now completing a flood control program that will divert water from the river through a diversion channel bypassing the city and returning to the river downstream. Incorporated in the design of the structures are 10 gates in the diversion dams that can be quickly closed and will back water up in the river and the county drainage ditch for a distance of 2 miles with an average dept of 5 feet. Downstream from the spilling weir to the chute, a distance of approximately 1 mile of diversion channel, the Army Engineers have granted the city permission to construct as many low-head dams as we may consider advisable in order to encourage maximum infiltration at selected locations. Thus, any water in the streams will have direct access to the sands and gravels supplying the wells. The wells in turn will not then be dependent solely on natural underflow and accidental river recharge through the sand and gravel outcroppings.

It would seem that this installation would go a long way toward solving our water supply problem for the foreseeable future. Time alone will tell. However, for the last 2 years we have had little or no flow in the Sioux River from the north. We had no spring runoff in the springs of 1958 or 1959 and the channel north of Highway

38–A has been bone dry for the last two summers. We have had to meet our water demands almost entirely from storage since August of 1957. Our test well records from here to Baltic indicate a steady drop in the water table since 1957 that to date amounts to an average of 7 feet. If this condition should continue for another year or two we will really begin to hurt. Our State water resources board has granted many irrigation permits upstream from Sioux Falls and has many more applications on file. We feel that full use of these permits would be very damaging, and the use that has been made of them is partially the cause of our present difficulty.

We are concerned about a fair solution. Reclamation for irrigation is a hotly argued public question and we have no desire at this time to condemn an ancient art that was established thousands of years ago. In his message to Congress in December 1901, President Theodore Roosevelt said:

> It is as right for the National Government to make the streams and rivers of the arid region useful by engineering works for water storage as to make useful the rivers and harbors of the humid regions by engineering works of another kind.

The Reclamation Act of 1902 was passed establishing irrigation as a national policy. The upper reaches of the Big Sioux River is rapidly becoming an arid region.

The Garrison diversion unit providing for diversion of water from the Missouri River to the Souris, James, and Red Rivers was authorized by Congress in the Flood Control Act of 1944. This study was made by the Bureau of Reclamation.

Some thought has been given to the advisability of constructing a pipeline from the Missouri River to Sioux Falls. The economic feasibility of such a project is questionable and would be of no benefit to people in the Sioux River Valley upstream from Sioux Falls. However, diversion from the Missouri to the headwaters of the Big Sioux would be of benefit to the entire valley. Any excess above our need would be returned to the Missouri at Sioux City, Iowa.

We realize that this would not be an "easy" reclamation project or one that could be constructed on a fully nonreimbursable basis. If a study of this project has not as yet been started, then I urge the proper Federal agency to do so at the earliest possible date.

Senator CASE. Mr. Browning, I think it was at the suggestion of some of the Sioux Falls people that I was prompted to place in the Omnibus Flood Control Act of 1958 an authorization for a study carrying water from the Missouri River over into the eastern part of South Dakota. Your suggestion here that the diversion be high enough to reach the headwaters of the Big Sioux is a very interesting suggestion.

I invite the attention of the Army Engineers to that suggestion in connection with the proposed study. The problem that you had at Sioux Falls is one that does concern the committee and we are certainly glad to have your statement presenting it as directly and concisely as you have.

Senator Kerr?

Senator Hart?

Governor Herseth?

Governor HERSETH. No questions.

Senator CASE. Thank you very much, Mr. Browning.

Mr. BROWNING. Senator, I would like to extend an invitation to this committee to view the flood control works as they are being constructed in Sioux Falls. It will take probably an hour of your time and these things I have referred to in my statement would form a clear picture in your mind, I think, if we could take an hour or so sometime today at your convenience.

Senator CASE. Mr. Browning, the other members of the committee have to leave and be airborne by 2 o'clock in order to make some other connections this afternoon. We have quite a list of witnesses that I think will take all of the morning. I personally will be here this afternoon and would be glad to accompany you or the mayor, whoever might want to go. I would like to see how the project is getting along.

Mr. BROWNING. Thank you, Senator.

Senator CASE. It was authorized by action of the Public Works Committee and we certainly would like to see how it is progressing.

The next witness will be Mr. Warren Hobson, manager of the chamber of commerce at Yankton, S. Dak.

STATEMENT OF WARREN HOBSON, MANAGER, CHAMBER OF COMMERCE, YANKTON, S. DAK.

Mr. HOBSON. Mr. Chairman, members of the committee, Senator Case, Senator Hart, Governor Herseth, ladies and gentlemen, I am Warren Hobson, manager of the Yankton, S. Dak., Chamber of Commerce.

With the chairman's permission, I would appreciate the opportunity of introducing two other gentlemen that I have with me here this morning who I feel are because of their particular jobs very much interested in the report of this committee and so on.

May I have your permission to introduce these two gentlemen?

The first gentleman I would like to introduce is Mr. Charles Danforth, chairman of the board of the Mississippi Valley Association.

Senator CASE. Glad to have you here, Mr. Danforth.

I, of course, have known of your interest in water matters for a long time and your effective work in the Mississippi Valley Association. I am sure Senator Kerr too, is familiar with the work of the Mississippi Valley Association.

Mr. HOBSON. Thank you, Senator Case. The second gentleman I would like to introduce is Willis Couch of the Missouri River committee of the Yankton Chamber of Commerce.

Senator CASE. Glad to have you here and have your presence noted.

Mr. HOBSON. We appreciate very much this opportunity of appearing before this Select Committee on National Water Resources to present the position of a community situated on the Missouri River which is vitally affected by legislation relative to its control and use.

We strongly urge the acceleration and early completion of the entire comprehensive development program in the Missouri River Basin.

We strongly urge Congress to make appropriations available, not only to carry out the orderly and prompt completion of the flood control and water conservation projects already authorized by Congress, but also to make funds available to the Corps of Engineers, the Bureau

of Reclamation, the Department of Agriculture and other appropriate agencies for the early completion of plans for additional projects necessary to realize the full benefits of flood control, navigation, irrigation, recreation, soil conservation, and hydroelectric power.

We support constructive programs designed to solve the Missouri River Basin's particular problems of water pollution.

We oppose any specific legislation which would modify the engineering and integrated functions of various projects as recommended by the Corps of Engineers, the Bureau of Reclamation and other responsible agencies. In addition, we urge the fullest development of recreational facilities on all reservoirs.

We urge Congress to accelerate appropriations for channel and bank stabilization work from Gavins Point Dam above Yankton to the mouth of the river. The tremendous loss of land by bank erosion from Gavins Point Dam to Sioux City, Iowa, has increased considerably since the closure and operation of the Gavins Point Dam.

We urge that Congress continue to appropriate necessary funds for continued study of bank protection and stabilization on this unimproved portion of the river.

In addition, we recommend early completion of the authorized 9-foot channel to Sioux City, Iowa, and are opposed to any restriction which might delay its early completion. Also, we urge that an early completion be made of the survey reports of the Corps of Engineers on the engineering and economic feasibility of navigation from Sioux City to Yankton, S. Dak., which would then become the headwaters of Missouri River navigation.

Donald O'Toole, president of the Pullman Trust & Savings Bank of Chicago, stated in an Associated Press release recently that "The Missouri River is the key to the future industrial growth of cities along that waterway. If the Missouri River were as well controlled as rivers in the East are, there could be a similar concentration of industry on it." It is a known fact that it takes less energy to move goods by water than by any other medium. Traffic on the Missouri has increased from 152,000 tons in 1953 to 596,116 tons in 1958, and promises to increase this year and years to come with the completion of the programed stabilization projects which will create a controlled 9-foot channel designed to scour itself. Unfortunately, the maximum development of the Missouri Valley's potential has been retarded in the past by conflict of interests in the various States.

In addition, we recommend the full development of irrigable areas which will increase forage crops, livestock, and cash crops. The annual gross farm income will be increased, and subsequent land values will increase subsequently. The improved tax base will yield millions of dollars of additional annual State and local taxes. Local business will be strengthened by furnishing supplies to farmers and marketing farm products, thus supporting significant increase in urban population. This local business, and the continuing program extending over half a century will provide a constant demand for materials and equipment from suppliers throughout the Nation. Studies of existing projects demonstrate that the development of irrigation provides a catalyst for regional economic development, improvement of living conditions, and enhancement of social values.

It is our further request that the Congress of the United States will continue to consider and maintain its previous role of representing the electorate and consequently passing legislation that will bring about better economic conditions of this country.

Thank you for this opportunity to present this prepared statement.

Senator CASE. Mr. Hobson, we appreciate very much your coming over to make your statement. There are a few points to which I wish to direct a little attention.

First of all, your emphasis upon the development of navigation. Do you remember offhand what is the mileage from Sioux City to Yankton, river miles?

Mr. HOBSON. No; I am sorry, I do not know.

Senator CASE. There is a statement that the channel would contribute to the ultimate use of that area for navigation. The Engineers have advised us at different times that they feel that the money we can appropriately put in there now for improvement of the banks will contribute to the navigation and make possible the better feasibility report when that work is done.

Mr. HOBSON. Right.

Senator CASE. There was one other sentence which you gave which I think might bear a little elaboration. You said, "In addition, we urge the fullest development of recreational facilities on all reservoirs. Are all communities in South Dakota in a position to appraise the recreational benefits of these reservoirs? Yankton is best placed. Lewis and Clark Lake has achieved remarkable figures. What do you estimate the visitation there the past year was?

Mr. HOBSON. I am very pleased, Senator, to expound a little bit on that particular topic. This is not a chamber of commerce figure but a figure that is furnished to us by the Corps of Engineers, which state that to their best knowledge and by their counters, Lewis and Clark Lake recreation areas have already tallied 1,750,000 visitors.

Senator CASE. Over what period of time?

Mr. HOBSON. That is from January 1 of 1959 to the present time.

Senator CASE. This is the third season that the lake has been opened for recreation?

Mr. HOBSON. Yes, that is true. For comparison figures, in 1957 the visitation figure was 750,000. In 1958 the figure was 1,300,000.

Senator CASE. This year 1,750,000?

Mr. HOBSON. To date.

Senator CASE. That, Mr. Chairman, should be of interest to you. I might say to those present that Senator Kerr is not merely a leader in water legislation generally, but he is one of the principal exponents of the belief that we should incorporate in our Federal legislation a formula for evaluating the public benefits from a recreational standpoint of structures built by the Federal Government. To date we do not have an adequate way of measuring the public benefits from recreation. We have discussed somewhat the possibility of incorporating something like that in some of the legislation before the Senate Public Works Committee. Certainly, Mr. Chairman, it has been three seasons since this 37-mile long lake was created by the Corps of Engineers. This constant level lake attracted 750,000 visitors in its first year, 1,300,000 in its second season, 1,750,000 in its third season. You have some support for your belief that there is a public value to recreation in these structures.

The CHAIRMAN. Thank you very much, Senator. I would not be entirely frank if I did not tell these good people in South Dakota that you and I are jointly sponsoring that legislation as we did title III of the Flood Control Act of 1958.

Frankly, it is my hope that we can make this measure title III of the Flood Control Act of 1960.

I would like to have this gentleman tell us what he thinks the economic value per visitor today is to the area where the reservoir recreational facility is located.

Mr. HOBSON. Thank you, Senator. I wish that I had known ahead of time that you were going to ask that particular question. The University of South Dakota is undertaking at the present time a survey to answer just such questions. They have given to us a pilot study which, if my memory serves me correctly, the economic value per visitor per day is somewhat over $2 that that particular individual is leaving or spending on his particular visit. I would not particularly like to be quoted as accurate. I would like to take the opportunity of forwarding to you this information from the University of South Dakota survey, which goes into more detail on this particular point.

Senator CASE. We will be glad to receive that and have that for the benefit of the study of the staff and the committee.

Mr. HOBSON. Thank you.

Senator CASE. Senator Hart?

Governor?

Governor HERSETH. Yes, sir. I should like to comment briefly on Mr. Hobson's remarks.

First, this is repetitious, of course. I was very much impressed, Warren, and I think it is revealing to everybody in the audience here the figures that you released on the visitation, the number of people who have visted the area from a recreational standpoint down there is that brief period of time.

The other thing that I thought was important, and I do not think this is repetitious—I haven't heard it, at least, before at the meetings that I have attended—that part that you brought out about the erosion of the banks and the wasting away of the edges of reservoirs down there. I happen to have had an opportunity on the seventh day of this month to observe that in a tour that some of the fellows took me on which you know something about down there. It is more than idle talk; I want to say that. It is important. It is something that needs attention. I don't know the answer for it.

I think we should certainly impressively and definitely bring it to the attention of the Army engineers and anyone who is capable of giving us some kind of an answer to it. I shall make a note of it myself to bring it up at the proper place later on.

The only other thing that I had, and I realize this is a real hard question to answer, but if you have, I guess they will be helpful to me. I noticed that you commented on the conflict of interest between the lower stream and the upper stream States that are concerned with the development of the Missouri River and if you have any remedial suggestions they will be most helpful and appreciated when we have our Missouri Basin Interagency meetings.

I think, perhaps, that the only thing that has come to my attention that might be a curative measure is the bill that was introduced in the

recent Congress authorizing the study of slack-water navigation. I think that probably comes as close as anything I know of at the present time. Whenever you or anyone else should happen to have suggestions that you think would be helpful and eliminate that conflict of interest and bring them closer to an agreement, we will get the show on the road much more rapidly.

Mr. HOBSON. Thank you, Governor.

We appreciate the opportunity of supplying more definite information in detail later on on this particular point.

Senator CASE. Thank you very much, Warren, for your splendid statement.

Mr. HOBSON. Thank you.

(The information referred to above follows:)

PRELIMINARY STATISTICS BY TOTALS COMPUTED FROM INTERVIEWS AT GAVINS POINT DAM, JUNE 15–SEPT. 1, 1959

Location of interview: Interviews are grouped by 11 major areas.

Number of interviews by day of week

	Number	Percent
Sunday	98	32
Monday	16	5
Tuesday	20	7
Wednesday	32	10
Thursday	32	10
Friday	46	15
Saturday	65	21
Total	309	100

Distance traveled by those interviewed

Distance	Number of parties	Percentage
Less than 10 miles	52	17
10 to 49 miles	62	20
50 to 99 miles	89	29
100 to 199 miles	72	23
200 to 499 miles	13	4
500 to 999 miles	15	5
1,000 miles and over	6	2
Total	309	100

Number of people interviewed

Adults	1,021
Children	745
Total	1,766
Average number of people per car	4.07

Number of times the interviewed visited the area

	Number of interviews	Percentage
Once	138	45
2 to 4 times	78	25
5 times to less than once a week	23	7
Once a week	26	9
More than once a week	44	14
Total	309	100

Length of time spent in area

	Number of interviews	Percentage
1 hour	13	4
3 to 4 hours	128	41
All day	88	29
Overnight	35	11
3 or more days	43	14
Undecided	2	1
Total	309	100

Overnight accommodations for those remaining overnight

	Number of interviews	Percentage
Motel	12	12
Hotel	2	2
Tourist home		
House trailer	11	11
Camping	52	54
Friends and relatives	16	17
Other		
Station wagon	2	2
Houseboat	2	2
Total	97	100

Other places visited

	Number of interviews	Percentage
Black Hills	7	13
Friends and relatives	29	53
Minnesota	4	7
Other	15	27
Total	55	100

Activities engaged in by those parties interviewed

	Number of interviews	Percentage
Fishing	156	50
Water skiing	18	6
Picnicking	159	51
Hiking	5	2
Camping	52	17
Boating	61	20
Swimming	116	38
Sightseeing	137	44
Other	22	7

NOTE.—This will not total 100 percent because a group could be engaged in more than 1 activity.

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Boating information

	Number of interviewed parties
Boatowners	57
Boat renters	6
Boat borrowers	5
In process of buying	1

Size of boat owned by those interviewed

	Number of interviews	Percentage
15 feet and under	38	67
16 to 20 feet	18	31
21 feet and over	1	2

Size of motor used by boatowners interviewed

	Number of interviews	Percentage
8 or less horsepower	9	16
9 to 15 horsepower	9	16
16 to 25 horsepower	9	16
26 to 35 horsepower	21	36
Over 35 horsepower	9	16

Amount of money spent by items by those interviewed

	Amount	Percent
Total amount spent	$2,552.00	100
Spent for—		
Meals in restaurants	382.00	15
Groceries	664.00	26
Snacks	317.00	12
Gas and oil for car	354.00	14
Gas and oil for boat	127.00	5
Fishing	269.00	11
Lodging	223.00	9
Other	216.00	8

Average amount spent by group reporting an expenditure

Average for total expenditure for group spending money	$11.15
Average spent by the group spending money for meals in restaurants	9.55
Groceries	10.45
Snacks	2.00
Gas and oil (car)	4.40
Gas and oil (boat)	5.30
Fishing	2.80
Lodging	18.60
Other	5.40
Average amount spent by all parties interviewed	8.25
Average amount spent per person interviewed	1.45

All figures are preliminary, 171 additional interviews are to be added to this data. In addition to this information obtained by personal interviews, 110 questionnaires received from registered boatowners at the reservoir will be included in the final bulletin to be published by February 15, 1960.

CARLTON S. VAN DOREN,
Business Research Bureau, State University of South Dakota.

Senator CASE. The next witness, then, will be Mr. Nils I. Aspaas, president of the Big Sioux Watershed Association.

STATEMENT OF NILS I. ASPAAS, CHAIRMAN, BIG SIOUX WATERSHED ASSOCIATION

Mr. ASPAAS. Senator Case, Senator Kerr, Senator Hart, and Honorable Governor of the State, my name is Nils I. Aspaas. I am a farmer who lives north of Sioux Falls here about 12 miles. At the present time I am the chairman of the Big Sioux Watershed Association in the Silver Creek Watershed Association.

As a result of problems caused by the flooding on the Big Sioux River and its tributaries, the Big Sioux Watershed Association was formed in 1952. Recognizing that South Dakota as a rule is short of rainfall, it is the feeling of our organization that water must be preserved where it falls. In order to accomplish this end we believe water should be conserved by contouring, terracing, and proper land use. Unfortunately, rainfall in this area sometimes comes too fast for these land use practices so we believe in the watershed approach to help solve our problem. In the reaches of the Big Sioux Basin one watershed has been completed, one is in the process of construction and several are in the planning stages. When all of the tributaries of the Big Sioux are controlled by proper land use programs it is our hope that it will again flow clear and safely within its banks.

Senator Kerr, and the committee, in the best interest of our country and future generations, we believe conservation of natural resources comes second only to conservation of human resources and certainly the conservation of soil and water is a means to this end. We believe the watershed program should be continued as well as the other phases of conservation of soil and water. May I say, adding to this, that in this State of South Dakota we believe in a balanced budget. As for myself and our organization we would like to see these things in a balanced budget rather than a deficit one.

Thank you.

Senator CASE. Thank you very much.

Do any of the members have a question?

I think following him we will call on Jim Biggar, who is the secretary of the Big Sioux Watershed Association.

STATEMENT OF JIM BIGGAR, BROOKINGS, S. DAK.

Mr. BIGGAR. Gentlemen of the committee, Nelson and I did not get together on this, so some of this may be a little repetitious.

My name is Jim Biggar. I live at Brookings, S. Dak., and have farmed all my life.

I am interested in the management of water in our State. I believe that water is a natural resource that needs our best consideration. Good management of water will help this State grow and prosper. Poor management of water may actually put us in reverse.

I was a member of the State water resources commission for 4 years. I have been secretary-treasurer of the Big Sioux Watershed Association since it was organized.

I believe our watershed program is one of the best approaches we have to managing our soil and water resources to the best advantage for ourselves and the future of our State.

We have two watersheds that are set up under Public Law 566. These two have completed their organization work under our State Watershed Act. The construction of flood prevention dams and other construction work is underway at this time in these two watersheds.

Organization work is well underway in three other watersheds. At least a dozen other areas have gotten engineering and organization work started in their local watersheds.

I am very much concerned about one thing, however, and that is: watershed development is not getting started in our west river areas and on the slopes to the Missouri River. Our people are becoming more and more concerned about holding water out there and keeping silt out of our Missouri River reservoirs. I believe our watreshed program can solve these problems in an effective manner. The program can also be effective in protecting other rivers from silt damage.

What is holding the program back from developing on the tributaries to the Missouri River?

One thing that is holding the program back, in these areas, is the benefit-cost ratio. This means that the Federal Government's costs in a watershed must be balanced by protection to or benefits to land that has been flooding in the past. In other words, the flood prevention benefits must be greater than the cost. The prevention of silt damage to our Missouri River reservoirs cannot be used as a benefit to balance against Government costs.

I believe that this should be changed. Where will South Dakota be when these reservoirs are full of silt? We will be in bad shape. We should really have a cooperative Federal and State study made of the silting in of these reservoirs. The study should be followed up with yearly determinations. All watersheds in this State must be approved by the State water resources commission, and before they are approved by the commission, the local people must have set up and voted in a long-time taxing program to cover operation and maintenance of the watershed.

I am interested in another subject which is irrigation. We have a very satisfactory water law in South Dakota. This law is administered by the State water resources commission. The purpose of this law is to promote the beneficial use of all the water in the State.

The possibility of irrigation in South Dakota is tremendous. The Sioux and Vermillion River aquifers are very large. These, added to other areas, make irrigation in this State very important.

In Turner County in the Vermillion River Basin about 10,000 acres were irrigated in 1958 and the test wells in that area showed very little drawdown in the water level.

The Sioux River and its tributaries have great possibilities for irrigation.

Brookings County, where I live, has 50,000 to 75,000 acres of underground water suitable for irrigation. We have six farmers irrigating now with great success.

I believe that the use of this underground water means great possibilities for industrial development.

This underground water can be put to good use without any wasting of the water resources in this area. Perhaps some Federal funds could be used for testing soils and water, to further determine the feasibility of irrigation.

It would certainly not be beneficial use of water if this underground water is not used for the benefit of the people in the State. Of course, we must be very careful not to use more water than comes into the ground from rain and snow, and water coming from the higher lands to the lowlands. The water resources commission has test wells in the underground areas of the State to constantly determine the water levels. The commission must approve all the irrigation permits.

I believe that the Soil Conservation Service, the watershed program, the Extension Service, the A.S.C. and other Government agencies should all work together to establish irrigation in this State in a practical manner.

I thank you very much.

Senator CASE. Mr. Biggar, that is an excellent statement. I want you to know that members of this committee are particularly interested in your commendation of Public Law 566, authorizing the watershed program.

Senator Kerr and I were members of the conference committee which worked out the amendments to the original Watershed Act, which we think helped to make it more workable. Since then, many of these projects have been getting underway.

You have two constructive suggestions here, and I merely refer to them by way of reference. One is that some authorization be made for giving evaluation for prevention of silt damage in the big reservoirs and the other that a survey be made for possible greater use of the underground water in the aquifiers for irrigation in certain parts in the eastern part of the State.

Thank you very much for your statement.

Mr. BIGGAR. I thank you.

Senator CASE. Any comment or question?

If not, the next witness will be Mr. Everett R. Brue of the South Dakota Wildlife Federation.

STATEMENT OF EVERETT R. BRUE, DIRECTOR, SOUTH DAKOTA WILDLIFE FEDERATION

Mr. BRUE. Senator Case, Senator Kerr, Senator Hart, and Governor Herseth, Mr. Chairman, my name is Everett R. Brue. I represent the South Dakota Wildlife Federation as a director and as the delegate to the National Wildlife Federation. I also am a member of the North and South Dakota Emergency Conservation Committee.

The National Wildlife Federation with which the South Dakota Wildlife Federation is affiliated is dedicated to resource conservation. In one of its publications it makes the following statement:

> In the development and revision of water rights legislation, the federation will insist upon recognition, including fish and wildlife management, as a beneficial use of water.

Recreation, Mr. Chairman, is rapidly becoming a major national problem. More people with more idle time demand that we increase the capacity of our penal institutions or provide places where, as family groups, they may enjoy nature and the out of doors.

Hunting, fishing, boating, camping, and picnicking afford healthy means of occupying idle hours.

Future water legislation should give grave consideration to keeping the waters of this Nation clean in sufficient quantity and available to the rapidly increasing demand made by the public for recreation.

Our past water management policy has not provided these safeguards. To too great an extent it has resulted in depleting the surface water areas of our State and Nation. We have eliminated nearly all of the surface water formerly stored in small natural reservoirs, from most of the continental United States. This has been done, largely to create additional agricultural cropland. It has resulted in adding to the surpluses which are a burdensome economic problem today. But of even greater significance, this drainage program has started other chain reactions and effected other economic problems.

This drainage of natural reservoirs increases the rapidity with which water finds its way into the tributaries and rivers of the Nation. To combat the overloading of these streams we are forced to build costly structures in the name of flood control. We have destroyed the reproductive habitat so necessary for production of migratory waterfowl, and waterfowling accounts for placing millions of dollars in circulation each year.

We have decreased the number of areas which could be developed for other types of recreation.

These are but a few of the results of drainage.

Time does not permit for mentioning more.

We recommend, Mr. Chairman, that future water legislation provide recreation as a primary use of water, and that the practice of draining surface water reservoirs into the tributaries and streams of the Nation be no longer tolerated.

Thank you for this opportunity to present this statement on behalf of the South Dakota Wildlife Federation.

Senator CASE. Thank you very much.

We are glad to have that statement in support or for consideration in connection with this recreation title that Senator Kerr has mentioned that we have thought about incorporating in the next flood control act.

The admonitions you have given will be given careful consideration.

At this time I want to note the presence of two more classes of Washington High School and assure these young people that they are most welcome at these hearings. We hope that they are at least of some interest to you. You may tell your teachers that we hope they will give you full credit for the time you spend here.

Now, the next witness will be Mr. Bill Holiway of the eastern half of the Soil Conservation District Association.

Mr. Holiway.

STATEMENT OF WILLIAM E. HOLIWAY, CHAIRMAN, MINNEHAHA SOIL CONSERVATION DISTRICT

Mr. HOLIWAY. Mr. Chairman, Senator Kerr, Senator Case, Senator Hart and Hon. Gov. Ralph Herseth, I appreciate this opportunity of being invited to appear here before you.

I am Bill Holiway, from Humboldt, S. Dak. I have lived and farmed the same farm all my life in Minnehaha County, S. Dak. I serve as chairman of the board of supervisors, Minnehaha Soil Conservation District. I am chairman of the Watershed Committee of the South Dakota Association of Soil Conservation Districts. I am appearing at this hearing today as a representative of the South Dakota Association of Soil Conservation Districts for the eastern part of South Dakota.

The eastern one-half of South Dakota can be classed as an area which includes a combination of intensive farming and livestock production. The statements that I here make are from the experience of being a farmer, in livestock production and work in the above-mentioned services.

To answer your questions, the quantity of watershed development needed:

The needs of this area will not be satisfied until we have complete development of our water resources. Floods and water yield are influenced by the condition of watershed land and cover. We must make every effort to control runoff and conserve water. This must be done farm by farm and field by field, benefiting the farmer on the upland by keeping soil, water and plant food at home and benefiting the lowlands by reducing floodwater and sediment damages.

We must control the flow of our water, placing an increasing amount of it into the underground reservoirs to come out downstream, filtered by nature in ample quantities to serve the needs of downstream neighbors. We believe they would appreciate this condition much more than the silt-laden floodwaters they now receive.

The answer to your question, when it is needed: It is needed now and the need for better management of our water will be at an increasing pace in the immediate future. Each heavy rain on unprotected watershed lands produces more sediment to be deposited in the already silt chocked tributaries and main stem channels, creating higher future costs of remedial measures.

Three, where it is needed: We need more research by Agricultural Research Service and our college experiment stations to find solutions to our soil and water conservation problems as related to each individual farmer's operations.

An example of these needs would be problems pertaining to hydrology, geology, and engineering design for watershed engineering. There are numerous problems in water management which pertain to irrigation, drainage, floodwater damages which should be resolved by experimentation or field trials. Improvement in erosion control factors also need consideration.

In soil management, we believe additional information is needed concerning cropping practices, types of tillage, fertility requirements, cover crops and surface soil removal. In addition to these, other phases of our program, such as rangelands, plant materials, woodlands and biology also have many important unsolved problems.

We need an accelerated educational program fostered by the Extension Service to bring the information gained through research, to the farmers and technicians in the field. The most effective tool we have to encourage management of our water is our educational program directed to farmowners and operators.

There is a need for more technicians in the field to help farmowners and operators in planning a soil and water management program on their individual units. All Federal, State, and local agencies must recognize and emphasize each other's efforts and work in complete harmony.

Four, what is creating the problem—what should be the pattern of development?

I think here we should take a good long look at nature and view in our mind's eye the rolling prairies of our area, when they were untouched by mankind. A line from the poetry of Badger Clark, describes them as "covered with the tall native grass, belly deep to the camel." This grass had a root system as tough and hard as wire—that penetrated deep into the soil and kept it open for the water to enter and find its way into our underground streams. The decaying growth of the past formed a thick, porous mat over the surface that absorbed water like a great sponge.

The tall grass retarded the excess waters so that they reached the streams in an orderly manner. It also slowed the melting of the heavy snows so that they did not reach our lowlands in flood proportions.

This was nature's ingenious way of making water serve its purpose as it went on its endless journey to the sea. Our underground reservoirs were full and overflowing; springs were flowing that kept our creeks and rivers supplied with fresh clean water. Our streams then were clear and silt free, they flowed continuously, and were not subject to flooding. Then came the complete drying up as we know it today.

History proves to us man cannot defy nature and survive. Throughout world history, we find examples that prove this fact. The best examples of this are the Biblical lands of milk and honey—producing in abundance that which today is a great desert wasteland and the Les Landes area of France, which was once a great forest and farm area and today is a land of drifting sand.

Our domestic cash crops do not have the vigorous root systems as compared to our native grasses. This has allowed our soils to solidify and pack, thus becoming more and more impervious to water. Soil cropped continuously without grasses absorb water about as well as a slab of concrete. Many of our fields in this area have been cropped this way for 80 or more years.

This does not allow the water to reach the underground streams the way nature meant it to—but sends it off over the top, taking the soil and plant foods with it and sending it downstream in flood proportions, making it poisoned and polluted and unfit for any purpose, devastating our neighbors in the lowlands, silting up and destroying the effect of the flood control works on our main streams, filling them with silt, till in time, they become useless.

Now we must seek substitutes for nature's way. By including our modern domestic legumes and grasses in our crop rotations, we can effectively substitute for the root system of the native grass. For the sponge formed from decaying vegetation, we substitute the contour strip cropping, the pasture furrows, the terraces and sodded waterways.

To feed mankind, we must harvest our crops. This leaves the land bare. It does not have the protection of the tall grass to retard the runoff and slow the melting snow. To replace this we must look

for other means. The one which best serves this purpose is the small watershed development program, under Public Law 566. Here, with land treatment practices, numerous small dams, grade stabilization structures, and channel improvement we can collect the excess water in the upland areas, and meter it downstream in a manner that will give us a stable flow of clean water that can be used by our downstream neighbors.

Most of the watershed development in this State is in the eastern part. At the present time the following watersheds have been approved for expenditure of Federal money: Silver Creek—that lies between here and Baltic—Wild Rice, Teewauken, Pattee, Brule, Richland, Green, Turkey Ridge Creek, Marne, Crow, and Upper Little Minnesota. Actual field construction started this fall on Silver Creek and Wild Rice watersheds; two flood detention dams on Silver Creek and one on Wild Rice are under construction at the present time.

Providing Federal money is available next fiscal year, additional construction can be carried on in Silver Creek and Wild Rice, as well as in Pattee and Brule watersheds.

Whenever local requirements have been met under the Watershed Act to start construction, this project should not be delayed because of lack of Federal funds. The watershed program in this area is expected to continue for many years. A recent survey indicated that there are over 100 potential watersheds which would fit into the Public Law 566 program. It is recognized that a watershed program is a community project. All farmers residing within its boundaries feel their obligation to carry on an accelerated land treatment program. In the watersheds worked on in South Dakota, we have found that land treatment practices have been applied at an accelerated pace.

Additional technical people are needed so that an accelerated watershed program may be carried on in addition to the going soil and moisture conservation program of the district. A watershed protection program recognized both upstream and downstream protection. We believe moisture can be stored economically with a project of this kind. With a watershed program, we will not be sending our waters downstream in devastating flash flood, silt laden and unfit for any purpose.

Five, what are the limits of expenditures justified in this field of soil and water conservation, watershed protection and flood prevention.

When we view the statistics and find the explosive increase in our population, which we are told doubles with each generation, it looks like we do not dare to place a limit on expenditures in this field. Soil and water must be conserved so that adequate food will be available for this fast population increase.

In conclusion, we believe the following is necessary for complete development of our soil and water resources:

1. Research.
2. An increasing educational program.
3. Technical assistance.
4. Federal appropriations.

To that last one I would like to add a little off-the-cuff statement. I was asked here, "Do you think a law is necessary to do all this?" To that I think the answer is, "Not a law but Federal appropriations."

Gentlemen, I wish to thank you for this opportunity to appear here before you.

Senator CASE. Bill, we are glad you did come. I think that until a better one comes along your statement will serve as almost a classic statement of the case for a watershed program. I already have alluded to the fact that Senator Kerr and I were members of the conference which finally shaped the Watershed Act, Public Law 566. As a matter of fact, in our Public Works Committee in the Senate we rewrote the bill that came over from the House and we did it on the basis of the suggestion that came from farmers and people such as you who are directly interested in the program.

It has not come to my attention that there is any serious lag in Federal appropriations on this program up to this time. It was slow in getting underway the first year because of some impractical provisions we felt, in the original law. But when we rewrote the law, we tried to get that straightened out and that was largely a matter of getting projects that would be engineered properly. There is a proposal now before the Congress, or suggestion from the Bureau of the Budget to establish a uniform basis as the measure of the local contribution. Personally, I have felt that there might be a little bit more uniformity or perhaps we ought to get some limits. But at the present time the local contributions have varied from as low as around 10 percent up to as high as 70 percent. That perhaps seems to be too great a disparity. But the suggestion that has been made that they be established on a uniform basis of 30 percent I feel would unduly hamper the program and would not take into consideration the contributions that can be made by local machinery, rights of way and other things of that sort. We would welcome your suggestions on that.

Senator Kerr, would you have any further comment or question?

The CHAIRMAN. I share your appreciation for this excellent statement and only emphasize what you said in that we rewrote this bill in the Public Works Committee in the exact language that you boys wanted. They came in and told us what you wanted. We put it in there. There was some doubt about its construction when it went to the Senate floor. We clarified that on the Senate floor. Your boys were in the gallery and in the reception room there and we were in constant liaison with them. Then we kept the language in the conference assembly as Senator Case said we had been able to get into it in the Senate.

There has been actually too little provision made for planning projects. I would presume that that is the bottleneck in South Dakota as it is in Oklahoma. But with reference to appropriation for the projects that have been planned and have had the approval of the soil conservation groups in the State, sent to Washington, approved there by the Department, and then to our committee and the similar committee in the House where they are approved, there has been no lack of appropriations for the projects that are available to get the money. Actually there has been some delay in Oklahoma and I would not be surprised if this is not also true in South Dakota. The tempo in which the local districts have been able to rationalize the necessity for contributions of rights-of-way and easements and removal of interfering things like pipelines and so forth has been

so fast that actually all the money appropriated has not been spent. But the Congress has appropriated all the money that has been economically usable for these projects that have been pushed through at the local and State levels and approved in Washington and are therefore available for the appropriation. I want to say to you that this is true as far as I am concerned, and from this record I know this is true of Senator Case and, from my knowledge of Senator Hart, I would say the same of him. There has been no delay in the providing of funds for these projects as rapidly as they are planned and approved and have the support of the people at the local level.

Senator CASE. Senator Hart?

Governor?

Governor HERSETH. I might make this comment, Senator. I gathered from the presentation that has just been made that it comes from one who has concentrated on and is very specialized in soil conservation practices. I look around the audience and I find that we have a concentration of that kind of people here today, too, at least of the farmer acquaintances that I see in the audience. I see several of them. The only thing that I regret is that when you travel over the country that you spoke of this morning and that we are all familiar with we do not find so many of them percentagewise out there on the land actually following the practices you pointed out so vividly here in your presentation.

It would be probably better if we had some of those people who do not heed this and have not concentrated on it in the audience than those who have. But it does not work that way.

Mr. HOLIWAY. Thank you, gentlemen.

I wish to point out that I did not intend to imply here that there had been ever any shortage of Federal funds. We know they have always been adequate. I only meant to remind here that as badly as this work is needed we should always keep them available as they have been to us in the past.

The CHAIRMAN. We thoroughly agree with that.

Senator CASE. You are talking to a sympathetic group here.

The CHAIRMAN. We think there can be no soil and water conservation that does not start in the areas where the water falls and that is brought about by these watershed development programs. We are happy to have you here with us because we are so thoroughly in agreement with your objective.

Mr. HOLIWAY. Thank you, gentlemen. I considered it an honor to appear here before you.

Senator CASE. The next witness will be Vic Clark, who is a farmer working in watershed development, as I understand it.

STATEMENT OF VIC CLARK

Mr. CLARK. Chairman Kerr, Senator Hart, Senator Case, and Governor Herseth, my name is Vic Clark from down the lower Big Sioux.

I farm down there in Union County. The Governor hit the nail on the head as far as we are concerned. We have an acute problem of flooding down there. Actually, we are a part of the Big Sioux Watershed Association and our president is Niles Aspaas. We are

a smaller watershed there. We call ourselves the Lower Big Sioux Watershed Association. Because of repeated floods back in the early fifties we organized down there and since that time we have had several large floods and have worked with the engineers to try and come up with a plan that would be suitable to our area down there.

We have gone to extensive surveys, checking with the people in the area and some of the facts and figures are set down here for you to check on. I don't think it is necessary to go through our ideas here and what we have in mind. But I can say this, that the plan that was proposed by the engineers in 1949 was turned down. I would say that probably the biggest point or turning point in that particular piece of work was probably right here at Sioux Falls. They did as much, I think, to knock the thing in the head as anybody could. But still we are getting water from this area up in here and it certainly is not doing us any good once it gets in the channel of the Big Sioux.

But since 1949 we have gone into Washington and I think Senator Case is aware of our problems pretty much, and he helped us very much in getting the money that we needed for the resurvey that has been carried by the Corps of Engineers in the last couple of years.

At this time the engineers have come up with a plan that sounds pretty good for the area as far as we are concerned. We originally intended that the work done be from the mouth of the Rock River to the mouth of the Big Sioux at Sioux City. But because of benefit-cost ratios the engineers have felt that the upper reaches of the lower Big Sioux should be eliminated.

So the way it sets right now, the Big Sioux channel will be from the mouth to 2 miles north of Akron, Iowa, which is where I live, across the river from Akron.

Senator CASE. Is this the last sheet of the three pages you have here?

Mr. CLARK. A summation.

Senator CASE. A summation?

Mr. CLARK. Yes, sir.

Senator CASE. Are these figures based upon the current studies of the engineers?

Mr. CLARK. Yes, sir.

Senator CASE. We have some representatives of the corps here. I wonder, do you have any time schedule for this? Could you tell us when this may be going out of the district or division office, Mr. Clark?

Mr. WEITHOP. Yes, sir. It should be going out very shortly now. It is in its final stages of being put together and reviewed and should be forwarded then through our normal channels into the chief's office.

Senator CASE. Do you think it may be done before January?

Mr. WEITHOP. We hope so.

Senator CASE. I hope so, too. Fine. I am glad to get that. I have got the Vermillion River report over in Washington now for the Board of Review. If we could possibly get this in there before the first of the year then there would be some chance of our considering it for inclusion in legislation for the next session.

Mr. CLARK. We would like to call your attention, Senator Case, and other members to a little map we have here on the second page. It kind of gives you an idea of the location of the Big Sioux watershed, and it is a tri-State area there, as you can see. Our area is

shaded in down there in the bottom of that watershed. But just north of Sioux City. That is the location of our lower basin area that has been devastated by floods here in recent years.

But it is interesting to me here that the project costs here, construction cost and the annual charge that the engineers have worked out for us, the Federal cost and local cost are listed there separately.

Senator CASE. Without objection, this entire memorandum on this project and the program will be incorporated in the record.

(The memorandum referred to above follows:)

FLOOD CONTROL IN THE BIG SIOUX VALLEY AS PROPOSED BY THE LOWER BIG SIOUX COMMITTEE

SECTION I

Most of the water flowing down the main channel of the Big Sioux River enters the stream at, or above, the mouth of the Rock River, hence must travel a distance of 85 miles through the lower channel. This is the area with which we are immediately concerned.

Because of excessive silting, growth of trees, and other obstructions, the capacity of the main channel has been greatly reduced in recent years. At the same time drainage from the upper basin has been speeded by actual ditching and tiling of low lands and heavy cropping of cultivated fields. Thus increased flow of excess water, combined with decreased channel capacity, has contributed to exceedingly damaging floods. Highest flood readings of record were made in 1953 and 1954. The fact that no towns are located in the flood plain reduces danger of what might be termed "a disaster," but does not lessen the importance of immediate flood control measures to those whose lands are affected.

We must add to actual crop losses the inestimable damage to potential earning power, property values, and health. Desirable crop rotations, livestock programs, and longtime farm plans cannot be carried out.

SECTION II

After the 1954 flood, the Lower Big Sioux Watershed Association was formed. A committee of 16 men was elected to represent the association in forming and carrying out flood-control plans. These plans consist of two main purposes: (1) A greatly expanded conservation program in the upper basin to hold as much water as possible where it falls is needed. We consider this a longtime program, desirable and necessary for permanent flood relief. It is a program being initiated now through the establishment of small watersheds. Many years will pass before an appreciable effect on flooding can be expected. (2) Increased channel capacity for some relief now before conservation practices can be effective. This would not be work of a temporary nature or for a temporary relief. Increased channel capacity is desirable and necessary for proper function of drainage systems of small watersheds now being planned. This is a fact recognized by soil conservation representatives.

In 1949, the Army Engineers drew up a plan for the Big Sioux designed to give complete flood protection at a cost of approximately $8 million. This plan was rejected by local people. They said too much land would be contained between proposed levees, and cost was excessive. Because there was not in existence at that time any organization of local people, no compromises were possible and the work was abandoned.

Today the situation is much different. Four serious floods have occurred since 1949. The Army Engineers have gained new knowledge and ideas. A well-organized local group is functioning and has been able to find out what program most of the people want. Representatives of Army Engineers have stated their willingness to work out a new plan in cooperation with local interests—a plan that will be mutually acceptable.

In view of the facts presented in this report, the representative committee of the Lower Big Sioux Association has set up the following goals:

(1) To obtain the necessary funds ($48,000) from the Federal Government for Army Engineers to make a new survey and formulate new plans for flood control in the lower valley. These plans would probably include straightening,

widening, and deepening of the channel and removal of obstructions whether natural or manmade. We feel even greater justification for this request since approval was granted for the Sioux Falls project, which will undoubtedly speed the flow of water into our already inadequate channel.

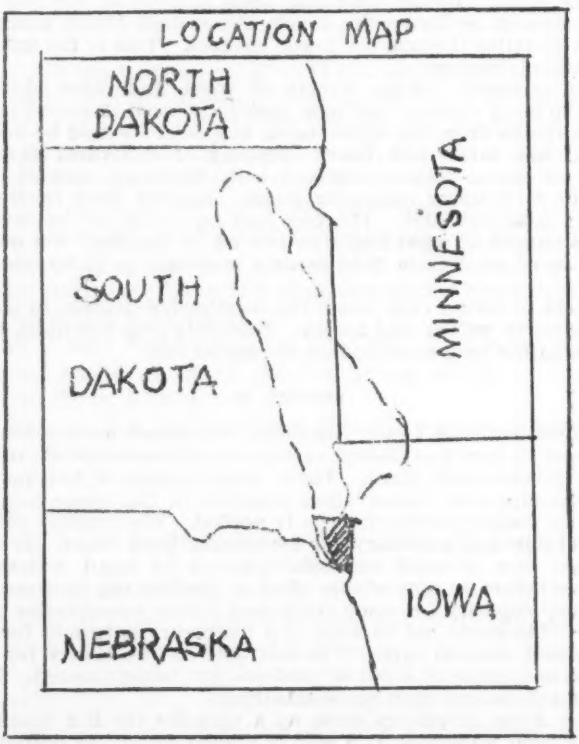
(2) To insure the final plan proposed will be acceptable to Engineers and local people. Improved channels some distance back from the mouth of contributing streams would need to be a part of the program; for example, Brule Creek, Broken Kettle Creek.

(3) To help get actual flood-control work started as soon as possible after a plan has been adopted.

(4) To work for establishment of more small watersheds in the upper basin, including the Rock River and its tributaries.

(5) To cooperate with all agencies of the State and Federal Government and other organizations which are interested in the problem of conserving water and soil and preventing floods.

LOWER BIG SIOUX RIVER



From its mouth at Sioux City to the mouth of the Rock River at Hawarden, a distance of 85 river miles, the Big Sioux River forms the boundary line between Iowa and South Dakota. It drains an area of approximately 6¼ million acres or 9,900 square miles, which represents an area about the size of the State of Vermont. The lower Big Sioux Basin is represented by the shaded area on the above map, while the entire area is indicated by the broken line.

SUMMARY

The summary of 152 questionnaires answered by farmers living in the lower Big Sioux River Basin and representing 95 percent of the flooded land (farms with less than 20 acres flooded make up only 5 percent of the area and are not included in this report) brought about the following information:

Number of farms, 152; total acreage, 19,676; average per farm, 129 acres.
Annual loss, 4 years (1951–54), $685,720; average per farm, $4,511.
Highest loss, 1 year (1954), $907,000; average per farm, $6,000.

The questionnaires further revealed that 120 farmers, or 79 percent, said they will support a program approved by the majority; 126 farmers, or 83 percent, want channel work. Only 6 farmers, or 4 percent, are opposed, or think river work unnecessary.

A resurvey of the lower Big Sioux watershed was completed in 1958 and the proposed plan presently calls for channel work from 2 miles north of Akron, Iowa, to the mouth of the Big Sioux River.

Estimated Federal cost----------
Estimated local cost----------

PROPOSED FLOOD CONTROL PROJECT LOWER BIG SIOUX RIVER, IOWA, AND S. DAK.

Location: Big Sioux River channel from the mouth to 2 miles north of Akron, Iowa.

Project: The project will consist of straightening, enlarging, and deepening the existing channel and will not include levees.

Length: Approximately 35 miles, about 20 miles shorter than the existing channel.

Design discharge: Lower 6.37 miles, 23,000 cubic feet per second and 19,100 cubic feet per second for the remaining channel above.

Rights-of-way: Approximatly 1,135 acres, which local interests will be required to furnish.

Project costs

	Construction cost	Annual charge
Federal	$6,468,000	$228,000
Non-Federal	280,000	[1] 16,500
Total	6,748,000	244,500

[1] Includes $3,500 maintenance and operation cost.

Project benefits: $334,900 per year.
Benefit-cost ratio: Favorable.

Senator CASE. The House passed an omnibus bill last session. We did not take it up in that session. It is customary for us to consider an omnibus bill every 2 years. The bill which was passed the last session in the House is in the work agenda of the Senate committee for this coming session. If this can get in there in time for consideration, we will consider it for what Senator Kerr has referred to as possible Flood Control Act of 1960.

Mr. CLARK. I see. We have some work to do here in our area. It is a State boundary line actually, between States, I should say. We have legal boards that must be set up and other requirements that we must meet. Any land that might be lopped from one State to the other there will have to be provisions made by the State legislatures for disposition of that land. So we have quite a little work to do on that locally but we still would like to see this in the bill.

Senator CASE. Do you understand that I am speaking for an authorization act, not appropriation?

Mr. CLARK. Yes, sir.

Senator CASE. The appropriation could not come until after authorization in any event. Construction could not begin if it were authorized until the requirements of local contribution had been settled.

Mr. CLARK. Yes.

Senator CASE. Senator Kerr, any comments or suggestions?
Senator Hart?
Governor?

Governor HERSETH. No, sir, Senator; I think it was very well presented by Vic. I appreciate hearing the remarks he had to make.

Mr. CLARK. This is quite a lengthy report here. But I felt we should skip through and hit the main points here. If, for some reason, you want to go through that, you can check it.

Senator CASE. We will place it all in the record.
Did you have anything further you want to say about it?

Mr. CLARK. No, sir; that is all.

Senator CASE. Thank you very much.

Mr. CLARK. Thank you very much.

Senator CASE. Next, then, will be Mr. F. F. Kerr, the associate county extension agent in Union County. I don't know what collusion there might be here. Whether he thinks he got an especially sympathetic audience in the chairman.

The CHAIRMAN. Well, if he thinks he has, he is correct.

Senator CASE. You are welcome, Mr. Kerr, and we will be glad to hear from you.

STATEMENT OF F. F. KERR, ASSOCIATE COUNTY EXTENSION AGENT, UNION COUNTY, S. DAK.

Mr. KERR. Members of the committee and Governor Herseth, I appear before this committee on the invitation of Mr. A. M. Eberle. I am associate county extension agent in Union County, S. Dak., and have done and I am presently doing considerable work on small watershed development under Public Law 566. I had not anticipated testifying before this committee until last evening when I received Mr. Eberle's invitation. A group of the watershed managers in our area met yesterday and discussed the possibility of someone testifying today. We felt that perhaps water control under the Public Law 566 approach was not the type of thing that your committee was interested in. However, since having been invited to testify, I am glad to do so.

I would also like to say that we felt yesterday that perhaps the small-watershed approach was a little too much of the small-potato type of thing for what you wish to consider. However, listening to the testimony this morning I am inclined to believe that the potatoes are pretty good size. You seem to be very interested, for which I am very grateful.

In Senator Case's letter five principal points of interest were listed. I will attempt to cover each to the best of my ability, and then in some cases I have lumped them together. First, regarding the quantity of water development needed, when and where needed?

Speaking from a local standpoint I can answer this question only by saying that most of the small towns in our area do not have serious water problems to date. There is one town, namely, Beresford, which has experienced a little water supply difficulty. In the Brule Creek watershed, one that is being presently organized, one structure is located in such a place, the town can if necessary, get a supplementary water supply from it. There are no other structures located

at strategic points for city water supply, neither are there any other structuers of suffiicent size to provide sufficient water for such use. If we are to consider irrigation the need is entirely different. If the water were available in watershed developments there would be many who would make use of it, I am sure.

Two, what should be the pattern of development? The intent of Public Law 566, as you know, is to give flood control, I have often felt that Public Law 566 could be revised to make it more of a dual-purpose development. By this I mean that in areas where water shortage is a serious problem the classifying of water detention for purposes of public use could be included as a benefit in computing the benefit-cost ratio. This would involve construction of larger water-detention pools and thereby greatly increasing the cost of easements necessary. In such cases perhaps it would be advisable for the Federal Government to assume a portion of these easement costs.

Three, what are the limits of expenditures that are justified? I feel rather poorly qualified to testify regarding this question because I do not believe that I am sufficiently aware of the big picture regarding national water shortage. As I said before, in our area there is not a serious shortage at this time, therefore, from our point of view, large expenditures would not appear to be justified. However, I am aware that this statement may be entirely untrue for many other areas. I do feel that public expenditures as being made under Public Law 566 at this time are entirely justified in our area for the purpose for which they were intended.

I will not read this last paragraph. My friend Bill Holiway has given you already much better information regarding the status of these watersheds than I have down here.

I would like to make one comment for your information, since I find you are very interested in the small-watershed development. From a local standpoint we have found that the world is not beating a path to our door when we come to develop these things, organize them. However, we are not particularly discouraged, either. The job is not easy but we did not expect it to be easy. I think I can give you from the limited experience that I have seen, some encouragement from the local standpoint. I think the concept is excellent. I believe that given time it will go.

Senator CASE. Mr. Kerr, we appreciate your statement. It is possible that in the administration of Public Law 566 that you have gained the impression that the primary intent was flood control. But actually, one of the changes that we made in the bill as we wrote it was to provide that there could be multiple purpose. The first 5,000 acre-feet of storage could be for flood control and the cost written off that way. But between the 5,000 acre-feet capacity and 25,000 additional storage can be provided on a reimbursable basis with the reimbursement from the agency that will use the water, whether a municipality or irrigators.

Or water conservation district, also.

I had a recollection that there were some people, I think in the Department of Agriculture, and perhaps in the Department of the Interior who wondered whether or not that might be creating new agency dealing with the irrigation. But since the Bureau of Reclamation was working primarily on larger scale projects, we thought

that where a structure was built it has lent itself to use beyond the flood protection for that small watershed and lent itself to the storage of water beyond the immediate needs of the watershed district. That item might be available for these other purposes.

Mr. KERR. Yes, Senator Case. I appreciate the intent of those changes. I understand them, also. The point I was trying to make was that if in some areas this municipal water shortage is critical enough, perhaps the law could be altered somewhat, too.

Senator CASE. Maybe it should be or perhaps we ought to have.

Mr. KERR. I don't say it should be, because I don't know.

Senator CASE. People who administer the law come before the committee and see if they have adopted an administrative policy of some regulation which hampers or cripples what I thought was the intent of the law.

The CHAIRMAN. As to representatives of any group, water conservation district, or municipality who feel they are having trouble getting consideration of what they would like to have in the project, I think it would be very appropriate for them to come and tell us so, because we wrote that so that 100 percent of that additional cost would be provided where it couldn't be otherwise done by the Federal Government on the basis of a repayment contract by the water users to reimburse the Government for the cost of the structure above the 5,000 acre-feet capacity and the terms of the advancement of the money are very favorable to the local users, whether municipality, conservancy district, irrigation district. I would hope that if any group contemplating one of these projects where the opportunity was available that were having trouble getting consideration of their project, that we would be advised about it. I am sure Senator Case would, and I know Senator Hart would.

Senator CASE. True. And also, if you have any suggestions on interesting some of these West River people more in utilization of it, I think we would be glad to get any suggestions there, too. I know two or three of the speakers have referred to the fact there seemed to be more interest in the eastern area. There are some areas of considerable erosion west of the river and they ought to take advantage of it, too.

Mr. KERR. The experience that I have had, of course, is East River. I am aware of the fact, however, that the West River situation offers a serious problem as far as South Dakota is concerned, due to the fact that the benefit-cost ratio cannot be obtained when it is necessary.

Senator CASE. Thank you.

Governor?

Governor HERSETH. No.

Senator CASE. Thank you very much. We appreciate your coming and having thrown light on a new facet of the problem.

Mr. Ed Lacey of Trent.

STATEMENT OF ED H. LACEY, TRENT, S. DAK.

Mr. LACEY. Hon. Senator Case, and Hon. Senator Kerr, Senator Hart, and our Honorable Governor, I have been invited to say something about the Vermillion River flood control project by Mr. A. M. Eberle.

I am not too familiar with the Vermillion River and its flood problems, but after seeing the job the Army Engineers have done on the Sioux River I am of the opinion that we should try to hold our water in the State as much as possible, instead of getting it out as soon as possible. This could be done by widening the channels and putting in low dams or spillways so that the water could be maintained at a level at least as high and preferably higher than it normally is.

When a river channel is straightened and put on a steady grade, it is constantly draining the water from the adjacent land. Where this adjacent land happens to be an aquifer such as the Skunk Creek or the Sioux Falls aquifers, it can lower the water table 3 to 10 feet depending on the depth the channel was lowered. This necessitates the deepening of all the shallow wells in the area. It also lowers the water level next to the river to a point where shallow rooted plants cannot reach it, making poor land out of very good farming land, especially if the land has a gravel subsoil.

In regard to the Sioux River project the Army Engineers have straightened the channel and put it to such a grade that water can make the trip around the town in about 6 hours where it used to take it 24 hours or more. The Northern States Dam has been taken out, as has the 8th Street, Sherman Park, and Elmwood Dams, dewatering all the adjacent lowlands. They cut into the lower end of the Skunk Creek aquifer and lowered the static water level in that area, then they cut into the great Sioux Falls aquifer limiting it to a set static level.

When this Sioux River project was started it was understood that there would be a gate at the head of the spillway and a gate at the south end of the aquifer southwest of the airport in the Sioux River, so that a high water level could be maintained in the river channel and also in the spillway channel.

This would have given us about 70 acres of lake area in both channels and would have recharged our aquifer in the immediate area of the city's present well system. Instead of that they have put a dam across the river south of 38–A and a cement wall or weir across the spillway ditch south of 38–A.

The purpose of this construction is to maintain a high level in the river north of this point, in hope that the water will percolate out into the aquifer and recharge it, which it will. The city has about 30 wells south of these structures.

The horizontal percolation of water according to reputable engineers is so slow that the recharging of the aquifer in the area of the 30 wells will not give them the capacity that they would normally have had.

It's a matter of record and history that a flood has always recharged the area around the city's well field, and that there was no complaining about a water shortage, unless we didn't get another flood in 4 to 5 years. It is nice to control the flood, but also good to keep the water home.

As the set up is now, Sioux Falls will be required to abandon the well system they now have in the airport area and construct a whole new field farther north and beyond costing millions of dollars, besides the loss of the present well field. It is already in the plans. (See

September 27, 1959, Argus Leader, $4,906,000 waterworks in plan for Sioux Falls).

Some thought should be given to the people below Sioux Falls. Where we used to have a natural meter north of Sioux Falls we now have two graded channels putting a further flood over the hill. The folks along the river below Sioux Falls will be looking for a piece of driftwood to hang onto next time, if the water is allowed to get below Sioux Falls without flooding the area north of 38–A.

Senator CASE. Mr. Lacey, we certainly appreciate your making this statement, and bringing this matter to our attention. With the limited time we have today, I don't think the committee has time to explore or ask the Army Engineers for comments, but I do invite their attention to this presentation, and suggest that they may later wish to submit a letter to the committee and a copy of that will be referred to you at the time.

Are there any other questions?

STATEMENT PREPARED BY DIVISION ENGINEER, MISSOURI RIVER DIVISION, CORPS OF ENGINEERS, IN RESPONSE TO THE STATEMENT BY MR. ED H. LACEY, TRENT, S. DAK.

Mr. Lacey made certain claims as to the harmful effects of straightening the river channel and by his reference to Sioux Falls infers that the project now under construction at Sioux Falls would lower the water table 3 to 10 feet and make poor land out of good farmland. The channel has actually been lowered an average of only 2½ feet with a maximum of 3.5 feet in the reach upstream of Madison Street. Below Madison Street the average amount the grade lowered was less than 1½ feet. No data are available on the water table under adjacent farmlands but the additional drainage through lowering the grade is considered to be insignificant.

Mr. Lacey states that certain dams have been taken out and infers that the Corps of Engineers removed the dams. The facts are these:

(*a*) The Northern States Dam has not been taken out and is still operative.

(*b*) The Eighth Street Dam was lowered 4.5 feet by the Corps of Engineers to provide the required floodway capacity to protect downtown Sioux Falls from flooding. However, when flashboards are used on the Northern States Dam the higher water elevation thus produced submerges the Eighth Street Dam and did so even before the top was lowered.

(*c*) The Sherman Park and Elmwood Dams were removed (or destroyed) prior to any construction work by the Corps of Engineers, by local interests.

Mr. Lacey indicates that the project now under construction makes no provision for recharge of the aquifer in the vicinity of the city water wells. The original proposal and the present plan are that gates would be provided on the diversion dam so that flow in the Big Sioux River could be maintained for satisfaction of downstream water rights and at the same time any excess flow could be diverted to the diversion channel. The diversion serves two purposes: (1) Extremely high flows will be diverted around the city of Sioux Falls, thus preventing flood damage, and (2) at the discretion of city officials, water may be diverted to aid in recharging the underground water supply.

It should be pointed out that the primary purpose of the construction carried out by the Corps of Engineers is to provide flood protection to the city of Sioux Falls. Their water supply has not been damaged by the flood control structures; in fact, a coincidental benefit may be derived by the fact that if sufficient water is available in the Big Sioux River a recharging of the underground supply will be aided by diverting water to the diversion channel. Such a recharging procedure was not possible prior to construction of the flood control project. Furthermore, history of the Big Sioux River reveals that in several seasons the flow has been so low that the streambed has completely dried up for months. On these occasions, the water supply at Sioux Falls has been critical. Such was the case before the flood control project was initiated, which indicates that the water supply shortage was a problem before the Corps of Engineers entered the picture.

Mr. Lacey further states that the city will be required to abandon the well system and construct a new field farther north at a cost of $4.9 million, again inferring that this is attributable to the project. The facts are that the city of Sioux Falls will not be required to abandon their well system. It is true that they are planning to build new wells, but only because they need more wells to increase the capacity to meet their growing needs—not because the project damaged their present system. The possible problems that might result at Sioux Falls were recognized at an early date and one of the major considerations in design was to make it possible for water to stand in the diversion ditch to maintain and improve the effectiveness of the aquifer. Of related interest is that the water commissioner for Sioux Falls in his prior testimony to your committee made no mention of any harmful effects attributed to the flood control project and he should be in a position to know.

Mr. Lacey also expressed fears for the people below Sioux Falls and deduces that the new project has aggravated conditions downstream. Our district engineer at Omaha has recently completed a study for this area. He found that although the flood control project would shorten the channel by approximately 13 miles that future flood stages and discharges would not be altered appreciably. Flood peaks from the upper Big Sioux River will occur a few hours earlier than they would have under previously existing conditions but there would be no increase in discharge or in risk to residents of the flood plain.

Although Mr. Lacey admitted his unfamiliarity with the Vermillion River, he ventured an opinion based upon his observations at Sioux Falls. Here again the grade would be lowered very little (an average of about 1 foot) and this is in accord with local desires. Farmers in the Clay Creek area, a tributary of the Vermillion, are among the strongest supporters of the proposed plan which contemplates improvement of the ditch. These farmers are convinced that solution to their problems lies in channel improvement. Study was given to the use of dams for flood control, but their use could not be justified. Low dams of the type proposed by Mr. Lacey would increase the cost of channel and levee improvements without increasing their capability for handling floodflows. Even if it were practicable and economically feasible to utilize these low dams the district engineer feels the local landowners concerned would be strongly opposed to such a plan.

We appreciate Mr. Lacey's interest in the conservation of our water resources but must conclude that he has relied overly much upon statements of generalities. In our basin planning, we must not project a solution for one basin from an observation in another, no matter how valid it may have been in the first locality. Instead, each project must be tailored to specific basin conditions and reconciled with the objectives of the residents of the basin. This we are attempting to do in our investigations throughout the country.

Senator CASE. The next witness will be Jack Burke, State Affairs Committee, representing the Sioux Falls Chamber of Commerce.

STATEMENT OF JOHN E. BURKE, STATE AFFAIRS COMMITTEE, SIOUX FALLS CHAMBER OF COMMERCE

Mr. BURKE. Mr. Chairman, gentlemen of the committee:

My name is Jack Burke. I am chairman of the State Affairs Committee of the Sioux Falls Chamber of Commerce.

Realizing that time is of the essence for your committee we have prepared a written statement, which we would like to submit to you at this time. I would like to do nothing other than particularly call your attention to the first suggestion that we make. We here in Sioux Falls are particularly interested in water resources as it relates to our community and we are faced with a dilemma of not knowing whether or not we do need help. So we have suggested that perhaps your committee might consider a program whereby competent engineering and geological help could be given the communities to determine accurately the water supply available for their needs and necessities for the foreseeable future. We feel that if we had this information and such water

supply was available in the near geographical location of this city we could solve our own problems. If it is not, then we would come back to your committee and ask that some consideration be given to getting this community and other communities similarly situated some of the water from the Missouri River development program.

Do you gentlemen have any questions?

Senator CASE. Mr. Burke, we thank you for your statement and also for your considered presentation. The formal statement will be placed in the record just as if you had read it all in detail.

(The statement follows:)

STATEMENT BY SIOUX FALLS CHAMBER OF COMMERCE

In this brief statement to the committee, the Sioux Falls Chamber of Commerce wishes to bring to the attention of the committee its thoughts and proposals concerning water resources and maters relating to its development Our proposals pertain primarily to problems and benefits of direct interest to our city, the southeastern part of South Dakota and our entire State.

We respectfully request this committee give serious thought and study to a program of surveys of municipal water supplies to be conducted by the Corps of Engineers or any other qualified Federal agency. In Sioux Falls we have experienced water shortages of various degrees. In working toward a solution to our water problem we have had studies made by various private engineering firms and qualified public officials. In each case there have been many questions left unanswered, and we find a diversity of opinion resulting from the multiple number of surveys and reports. It is our firm belief that if the Federal Government were to provide a standard method or procedure of compiling data on municipal water supplies, making concrete recommendations and final determinations it would be most helpful to our community and all other communities throughout our country.

We know our city, as do most cities in America, needs a constantly enlarged supply of water as our population continues to grow. We feel a uniform type survey would be most helpful and could be in reality the real answer to a guide for future action on a solution to water supply problems by the communities throughout our country. We most certainly agree that the final solution should be a responsibility of the municipal government. However, we do feel uniform Federal water supply studies would be a most helpful and beneficial factor.

The Sioux Falls Chamber of Commerce has always been vitally interested in the work and efforts of the U.S. Soil Conservation Service. We further support the efforts of the soil conservation districts, their related associations and combined efforts. We heartily recommend that all possible aid and support be given the Soil Conservation Service in carrying out their goals of "holding the water on the land." As you know, this involves various types of structures and techniques, including retention dams, terracing, contouring, and other soil conservation practices. The benefits from a good soil conservation program are tenfold. It holds the valuable topsoil, it produces more crops, it enhances farm property values, and in the case of Sioux Falls, it becomes an integral part of our city's flood-control program. In this instance we refer directly to the Silver Creek watershed immediately north of our city. We are of the firm opinion this will have great value in an all-inclusive flood-control program for our city.

The third matter we wish to bring to the attention of this committee is the matter of migratory waterfowl conservation through proper land and water practices. We have observed over the past number of years that a program of drainage has removed many breeding and feeding grounds for migratory waterfowl. Waterfowl hunting in our State is a big business. Many thousands of duck stamps are sold each year and the economic value of the related items including travel, food, firearms, and equipment is a tremendous economic resource in our State. We feel a study should be made and efforts put forth to assure that thorough, proper, and orderly study will be given to any future draining of areas that serve the duck and goose population as they breed in, feed, or move through our State. We know the Department of Agriculture, the National Wildlife Service, and many other agencies are directly affected and concerned with this matter. We feel this matter is of enough area interest to bring it before your important group.

You are no doubt aware of the problems connected with our city water supply. We are pleased to report that the Sioux Falls City Commission has a continuous program of expansion and enlargement of our present well field. We hope this program will provide adequate water from the aquifer immediately north of Sioux Falls. The major part of the solution is our city distribution program. This is being given serious and constant study by the Sioux Falls officials. We bring this to your attention to point out that in this one instance a city is solving its own problems without need of Federal help or financial aid. It's a problem directly related to Sioux Falls and we feel it is being handled at the present time to the best of our ability. Further programs will be carried out as bond issues are approved by the voters of our city.

We commend this select committee of the Senate for the time and effort you have put forth in these field trips and hearings throughout our country. We are certain it's of great value to you gentlemen and gives you many thoughts, proposals, and ideas to take back to Washington to make a part of a constant program of further development and conservation of our most important national resource—adequate water.

Senator CASE. Now, with respect to what you have just brought up, I might say that the committee has available to it the services of Mr. Ted Schad, the staff director and others. If you want to refer some questions to us that could be done in a factual sort of a basis, I am sure that Mr. Schad would be glad to give you what suggestions he could based upon that. Yesterday at Huron we had the benefit of a very fine statement from Mr. Agnew, the State geologist at Vermillion.

In that he emphasized the research they were making on water supplies in the State and particularly to the southeastern area.

I am sure that Mr. Agnew also would be glad to come in. Maybe I shouldn't say that. Maybe I should leave that for the Governor. But Mr. Agnew yesterday did speak along that vein that they wanted to be of service to different communities in the State in relating their knowledge of water supplies to local problems.

Mr. BURKE. Senator Case, our problem epitomizes this. We have an aquifer north of town which we use for our water supply. We have had surveys in the past by the State geologist and in addition to that the municipal government has on various occasions hired what we feel were competent engineering firms from Chicago, for example, Gregory and Hanson, to explore the aquifer. They came up with some divergent and conflicting answers that the people in Sioux Falls, and particularly the municipal officials are in a quandary as to whether or not we have located north of Sioux Falls in this aquifer a sufficient supply of water for our municipal needs for the foreseeable future. In other words, we have gone to what we felt were experts and all we get is conflicting opinions. So we felt that perhaps the work that has been done hasn't been thorough enough or the manpower to actually make a thorough survey has not been possible. We understand that the Corps of Engineers is equipped to do this particular kind of work.

Senator CASE. I am not sure that the Corps of Engineers, and maybe I should let them speak for themselves on this—I am not sure that the Corps of Engineers would come as particularly a referee between different experts on a municipal water supply problem. But if there were a concrete problem that might be presented to them for a study that would be within the scope of their legislative authority, they of course would be glad to consider that, under a resolution by the committee.

Mr. BURKE. It involves such ancillary things, Senator Case, as what we understand was at one time a contemplated program for moving water from the Garrison Dam through the James River to the Sioux River through a series of dams, which, of course, would have a vital effect upon our water supply because the Sioux River does recharge the acquifer.

Senator CASE. That, of course, is a specific proposition that has been suggested and I did discuss with representatives of the Bureau here this morning of the possibility of some further study along that line. In view of the time factor this morning, however, may I suggest that since they are present and note your observations that perhaps I could meet with you or your Public Affairs Committee some time later and see if this thing could be resolved into a concrete matter that might be referred to the engineers and be within the scope of authority or responsibilities that they have?

Mr. BURKE. It would be very kind of you, Senator, and we would look forward to it. Thank you.

Senator CASE. At this point I would like to have the representatives of General Garney, division engineer and Colonel Hammond, the district engineer who are present, would you representatives stand and give your name for the reporter so they can be noted in the record?

Mr. WIETHOP. Yes, sir; I am Russell Wiethop, representing Colonel Hammond, district engineer at Omaha and we are also representing General Barney, the division engineer at Omaha. This is Kenneth Rustof, my assistant.

Senator CASE. Thank you very much.

Mr. BURKE. Thank you, Mr. Chairman and Senators.

Senator CASE. We have a group of witnesses here from Sioux City and South Sioux City. They are most welcome and we want them to have an opportunity to present their statement.

The committee was invited to be the guests of the Kiwanis Club at luncheon this noon but we have a little distance to walk there. I am wondering whether the Sioux City people would want to present one witness now or would you rather come back after lunch? I should advise you also that Senator Kerr and Senator Hart are going to have to leave folowing the luncheon and will not be able to attend the hearing this afternoon. But the statements can be taken and will be incorporated in the committee record.

STATEMENT OF DALE VOSS, JR., PRESIDENT, CHAMBER OF COMMERCE, SOUTH SIOUX CITY

Mr. VOSS. If possible, Senator, I am from South Sioux City and cannot get back. If I may give this short statement.

Senator CASE. We will hear it.

Mr. VOSS. I won't go into my statement too thoroughly, other than all of you know in this area around our territory the farms are getting larger and more of the farm labor is going into the city for a livelihood. This makes it a particular problem and the navigation aspect of this greatly helps this particular problem. Through the wisdom of the Army engineers and the foresightedness of Congress we have seen this change since 1952 when it nearly took our city and a number of cities below to obtain a domestic animal to work for all of us if we continue

this project which now has a relatively few miles to go for completion to the navigation aspect of the overall plan.

We have noted that with considerable alarm, that a couple of years ago the upper basin interests are recommending that the upper stream water be retained in reservoirs to be utilized primarily for power.

These sentiments, of course, have their merits, but we feel this river can work for the entire valley if our neighbors above us will be patient and realize that we should share and share alike in benefits of this river.

Now, digressing from my statement and in connection with a comment by the Governor of South Dakota this morning in which he mentioned the problem, I have here an information bulletin that was prepared for hearings before the Senate Committee on Interior and Insular Affairs in Omaha on May 1 and 2 of 1957. And in that prepared information statement the following appears:

A comprehensive Missouri Basin program popularly known as the Pick-Sloan plan was authorized by Congress in the Flood Control Act of 1944 approved December 22 of 1944. That law authorized the upstream reservoirs, downstream bank stabilization, tributary stream projects and levees for multiple-purpose uses, flood control, irrigation, navigation, and hydroelectric power. After extensive hearings the so-called O'Mahoney-Millikin amendment was incorporated into the Flood Control Act. Section 2 thereof provides use for navigation in connection with operation and maintenance of such works here authorized for construction of waters arising in States lying wholly or in part west of the 98th meridian shall be only such use that does not conflict with any beneficial consumptive use, present or future of States lying wholly or partly west of the 98th meridian of such waters for domestic, municipal, stockwater, irrigation, mining or industrial purpose. A review of these hearings indicates that the subject of possible conflicting water uses was thoroughly aired with upstream recreational interest and downstream navigation interest adequately represented. The subject of hydroelectric power was mentioned infrequently and only incidentally. The primary concern of the upstream States was to prevent the jeopardy of future irrigation when such water might also be needed for navigation. The problem was ultimately settled by adoption of the O'Mahoney-Millikin amendment.

So I believe it behooves us all to live with this problem. It has its disadvantages presently, until these dams are full, the reservoirs are full that we have some benefits to be derived and some disadvantages to both upper and lower basins. I think we should live with our problem and continue as it has been doing.

(The prepared statement follows:)

STATEMENT OF THE SOUTH SIOUX CITY, NEBR., CHAMBER OF COMMERCE AND THE CITY COUNCIL OF SOUTH SIOUX CITY, NEBR.

In northeast Nebraska more and more farmers are expanding their operation either by buying or leasing additional land which is gradually decreasing the number of tenant farmers and other farm laborers. The result of this continuous shift of farm population to the towns and cities is a serious shortage of jobs which can only be relieved by additional industry.

In this particular area we are at the head of river navigation on the Missouri River which everyone recognizes as one of the finest river valleys in the United States. We here have all watched the progress of the Army Engineers on the river, the gradual push upstream toward us of navigation and the reservoir system above us. We have seen the results that have been accomplished below us in handling grain, steel, fertilizer, sugar, feeds, and many other products that must move into and out of our area. This movement, by water, makes the towns along the river natural locations for new industry which we sorely need to take care of our people.

Through the wisdom of the Army Engineers and the farsightedness of Congress we have seen this river change from an unruly raging beast (that nearly took our city in 1952) to a tame useful domestic animal that can now work for us if we continue this project which now has only a relatively few miles to go to completion of the navigation aspects of the overall plan.

We note here with considerable alarm that some of the upstream interests are now recommending that upstream water be retained in the reservoirs and be utilized primarily for power. These sentiments of course have their merits but we feel this river can work for the entire valley if our neighbors above will be patient and realize that we should share and share alike in the benefits of the river.

In that connection we should all remember that the Flood Control Act of 1944 recognized that in the multiple-purpose development of the water of the Missouri Basin, all interests, both upstream and downstream, must be recognized. The compromises contained in the law were sound evidence that the basin States could get together on a mutually advantageous program, retaining their rights to an equitable share in the benefits of controlled water. Since that time the construction phase of the program has proceeded until the present time, when more and more emphasis can be placed upon the utilization phase of the river program. This utilization phase must necessarily involve both upstream and downstream citizens. It must also recognize the needs of all areas for water from the Missouri River.

It has been the opinion of sound thinking businessmen and farmers throughout the basin that equity and moderation should prevail; that until the main stem reservoirs are completed and filled, citizens of the basin should share and share alike in both the benefits and the disadvantages presently available in the incomplete system.

Senator CASE. Any questions or suggestions?

Thank you very much.

I have three more witnesses listed and they are all from Sioux City. I don't know which one should be recognized first. I wonder, Mr. Wigton, Mr. Austin, and Mr. Wimmer, if each of you would stand and tell me about how much time you think your statement would take.

Mr. WIMMER. I am Mr. Wimmer. I think I could sum this up in a matter of 2 to 3 minutes.

Mr. AUSTIN. I could do likewise, Senator, and not read the entire statement but summarize it.

Mr. WIGTON. About 3 minutes.

Senator CASE. All right.

It is 5 minutes of 12. I wonder if we may not proceed and take the statements and go over to the Kiwanis luncheon later. That would be better than coming back this afternoon.

Which one of you gentlemen wants to come first?

STATEMENT OF R. W. WIGTON, SIOUX CITY TRAFFIC BUREAU, SIOUX CITY, IOWA

Mr. WIGTON. Mr. Chairman, Senator Case, Senator Hart, and Governor Herseth, I am R. W. Wigton, commissioner of the Sioux City Traffic Bureau, Sioux City, Iowa. The traffic bureau is a voluntary association of shippers and we deal primarily in the freight-rate areas protecting Sioux City and the areas that it serves in this manner. I will summarize this statement this way. We have been very watchful of the development of barge transportation. We are thoroughly convinced that from a freight rate standpoint it is extremely vital and essential not only to the economy of Sioux City but to the

economy of the areas tributary to Sioux City, particularly boiling it down to the farmer.

In my prepared statement I call attention to a specific example that has recently come about which is explained more in detail but summarizing States that the rail freight rates on grain, and I am speaking of corn particularly, it includes other grains, from origins in South Dakota, approximately north of a line from Pierre through to Brookings were reduced into Minneapolis, due to the fact that Minneapolis is able to use barge transportation outbound and use truck inbound. This is not true of the farmer south of that line, who is served by Sioux City because we do not have barge. It is rather lengthy but I would summarize the entire statement this way, that of all the things that could help the economy of this entire area the most I think that reliable full scale navigation is the single most important factor. We wish to go on record as strongly supporting and urging the continuance of the funds for the completion of the channel, 9-foot channel south of here particularly from Sioux City on down to the mouth and to do everything possible to fully utilize this important feature.

Thank you, gentlemen.

Senator CASE. Thank you very much, Mr. Wigton. I can assure you from my personal knowledge of the attitude of the chairman of the select committee and from attitudes of the Public Works Committee that this will have very careful consideration, and your entire statement will appear in the record at this point.

Mr. WIGTON. Thank you, Senator.

(The prepared statement follows:)

STATEMENT OF R. W. WIGTON, SIOUX CITY TRAFFIC BUREAU, SIOUX CITY, IOWA

I am R. W. Wigton, commissioner of the Sioux City Traffic Bureau, Sioux City, Iowa.

The traffic bureau is a voluntary association of shippers and receivers of freight in Sioux City, and our purpose is, among other things, to keep Sioux City and its surrounding territory in a competitive position freight ratewise. Sioux City is dependent upon the farmers for its prosperity and it can be stated that what helps the farmer helps Sioux City and, conversely, what helps Sioux City helps the farmer.

One of our most important jobs is the development of freight rates on whole grains. It has been my particular job for a number of years to act as the traffic representative for the Sioux City Grain Exchange, which is one of the primary markets in the grain marketing field. A primary market serves the function of providing an outlet or buyer for the large quantities of grain that are harvested each fall. This market provides the farmer with a buyer for his grain whenever he wishes to sell it. Freight rates are probably more important to the grain business than to any other business in existence.

Since the war I have been well aware of the development of water transportation and its impact on freight rates. This form of transportation, with its inherent advantages of low rates, has gained each year. I doubt very much that the average person realizes the importance and the advantages of having direct barge service, or being in areas tributary to barge service. I wish to emphasize the fact that the benefits derived from water transportation are not restricted to the city where the barge actually docks, but extends to large areas surrounding such ports.

Realizing this importance, Sioux City has been successful in securing limited barge service, which would give us at least some of the benefits pending completion of work on the river and ample water supply with a resulting full-scale barge operation. This small operation has already paid dividends. In 1958, which was the initial year of this service, Sioux City loaded three outbound barges of grain. Every pound of the 1,500 tons of grain shipped on those three

barges came direct from South Dakota origins and most of the price benefit was passed back to the seller in South Dakota. In the past season of 1959, we had only one barge in and one barge out due to the construction of the Federal Interstate highway, which prohibited access to the river front. However, next year we anticipate a larger operation than in 1958.

Returning to my statement that what helps Sioux City helps the farmer, I would like to point out an example of recent changes which will give you a picture of the importance of barge service to the farmer. Minneapolis, Minn., is a very large primary market. It functions the same as Sioux City. Minneapolis is a very large user of barge transportation for grain. It ships millions of tons of grain outbound by barge each year. Due to the manner in which the grain marketing is set up, and the way the grain rates are established to fit in with this marketing pattern, Minneapolis is able to use exempt trucks for the haul of the grain from the producing areas into Minneapolis and then use barge out. This is true of many of the other primary markets such as Chicago, Peoria, St. Louis, Kansas City, and Omaha. The truck charge for hauling grain from the producer to a market is generally less than the established rail rate. As a result of this, the railroads in the past few months have attempted to regain this traffc by reducing what is known as the "gathering" rates. These are the rates charged by the railroads from a country elevator into the primary market. The reductions were specifically designed to meet or to beat the truck competition. As the price of grain is pretty well set by the rail rate, this meant that the producer in the origin area receiving the reduction would receive more money for his grain. Now this is a fine thing, but I must further point out that the area receiving the reduction was limited to those points having actual truck movement. Specifically, it applied only from points in South Dakota on and north of a line drawn approximately from Pierre, S. Dak., through Huron and Brookings, or approximately the northern half of the State. It also included producing points in the State of Minnesota. Areas in South Dakota south of this line normally sell their grain to Sioux City and they will still do so. It is the normal place for the grain to go due to the fact they are considerably closer to Sioux City than any other market. Because Sioux City does not have barge outlets for grain, we must buy this grain and ship it into Sioux City on rail and pay the farmer less money due to the comparatively higher rates to Sioux City. Now Sioux City draws its grain from the southern part of South Dakota, southern Minnesota, northern Nebraska, and the northwest quarter of Iowa. This area is too far from the other markets to ship there profitably even with the lower available barge rates. So these farmers must still rely on Sioux City for the money they get for their products. This puts Sioux City in the position of having an extremely difficult time competing with the other markets due almost solely to this barge transportation feature. It not only puts a dealer at Sioux City at a severe disadvantage, but it reflects right back to the farmer. With adequate river transportation Sioux City would without a doubt be able to do a much larger business, give the farmer in the area that it serves a higher price for his grain, which would result in a better economy all around for everyone involved.

You must realize that any amount saved by using barge or truck cannot be kept by the dealer. It must be used by him to bid higher prices in the country origin for the grain to meet the competition that exists, or a part of it may be needed to offer a lower selling price at the destination to meet competition. It is rare that the middleman, or the grain dealer, can put any of this reduction in his pocket.

The benefits of barge transportation would spread itself to the same area on inbound products. Among the commodities that move by barge are the ingredients used in producing animal and poultry feed. I think you gentlemen are aware of the cost of feed for animals raised on the farm. A large part of this cost is in the freight transportation needed to get the raw materials into the manufacturing plant and then get the finished feed from the plan to the farm. Molasses, for example, moves by barge to many points. The savings in freight is then passed on to the farmer in the way of lower prices on finished feed. Other articles would also tend to help the entire area. Steel is another item that moves in large quantities and is used in almost every type of construction, such as schools, highways and other public enterprises which the taxpayers must pay for ultimately.

The benefits freight ratewise are not all entirely tied into the actual use of the barge. With the increase in river transportation, other modes begin to

take action to meet the competition. The railroads in particular are affected. The rail carriers establish drastically reduced rates from and to those points where barge competition exists. It therefore comes to the point that if you have barge competition you are going to receive reduced rates. To point out the importance of this situation the Interstate Commerce Commission recently recognized Sioux City as a barge competitive point in a case involving a grain rate reduction from Minneapolis. Now from my standpoint this is highly important because it states in substance that we are also entitled to comparable rate reductions as the other barge points are receiving. However it is obvious that such a ruling can stand only if navigation is progressed. If the work on the river is not completed, or if our water supply is reduced to a point that makes navigation impossible, the result will be the elimination of our position as a barge port and result in continuing high freight rates. The cost of moving goods are passed on to the ultimate consumer, so whatever we receive in the line of rate reductions will benefit the consumer, whatever increases we receive will also be passed on.

I will state emphatically that the present and future progress freight ratewise, of all States adjacent to the Missouri River will surge forward or wither on the vine in direct proportion to the action taken to encourage or discourage river transportation. We, in this area are literally in a life and death struggle with points on the Mississippi, Illinois, Ohio, and other eastern rivers. Those points have developed navigation to its utmost and are reaping tremendous benefits. By having low water rates, these areas to the east have left practically every State here represented on a high plateau ratewise. We cannot hope to lower this plateau except by the same means, namely, lower water rates. If navigation on the Missouri River is not progressed, we will most certainly see industry looking elsewhere for its locations. By "we" I mean not only the cities both large and small, but every town, village, and farm in this entire area.

STATEMENT OF W. BURNET AUSTIN, DIRECTOR OF PLANNING, CITY OF SIOUX CITY, IOWA

Mr. AUSTIN. Honorable Senators, I am Burnet Austin, director of planning for the city of Sioux City. I would like to point up rather than read the items which are covered in my brief presentation, that to begin with, the Missouri River is considered a part of the overall transportation plan of Sioux City. We are going ahead with the idea that we will have industrial development based upon river transportation. We are organized with legislation and with the organized commission to undertake docking facilities in Sioux City and we have things set up so we can go ahead. One thing had been brought up here before, and that is we consider the Missouri River a recreational asset in the city of Sioux City and we find there is great demand.

I might say that if you people will tell us who can use any information of an economic nature and professional caliber as to the economic benefits for recreation of the Missouri River at Sioux City, we are able and staffed to provide data for you to use in this regard. We don't do it unless we would know who we could give it to so it would be of use.

Senator CASE. I can assure you that that information will be appreciated and received by the Senate Committee on Public Works. Senator Martin of Iowa is a member of that committee and if you would channel that material through him to the Senate Public Works Committee it will be of interest to us as we consider the proposed recreation title of the next omnibus bill.

Mr. AUSTIN. On the second page I indicated some of the economic benefits. You notice I supplied a report here. There is the data in there that can be analyzed to tie down what economic impacts there are to people and I emphasize in the next to the last paragraph that

taking the retail and wholesale trade of the city of Sioux City about 43 percent of this depends on farms. And the prosperity of the farms. A city of 100,000 population is dependent, really, for prosperity on the prosperity of the farmers. We realize that getting a good price and getting their produce to market is an important factor in this prosperity. We consider that the navigable Missouri River is essential to the prosperity of both the farmers which we depend on and to the city of Sioux City.

Thank you very much.

(The prepared statement follows:)

STATEMENT BY W. BURNET AUSTIN, DIRECTOR OF PLANNING, CITY OF SIOUX CITY, IOWA

The Missouri River as a highway of commerce is an integral part of the transportation planning of the city of Sioux City. The present city has over 6 miles of frontage on the Missouri, and action is now underway to annex additional territory which will add an additional 3½ miles of riverfront.

This annexation is being undertaken as a result of the great industrial development potential afforded by the control of floods on the river and the opportunity for use of from 2 to 3 miles of riverfront on which industries can provide dockage to receive riverborne cargoes. Land in this area has already been acquired by industrial interests in anticipation of dependable and frequent barge service.

The city of Sioux City has an organized public dock commission with State authority to provide for improvements and operations. A special tax of one-half mill on a dollar may be levied for this purpose. The Sioux City Municipal Dock Commission has a comprehensive plan for improvement to follow the growth in navigation. Appropriations for the year 1960 are $42,000.

An interchange on Interstate Highway 29 is nearing completion at the dock site and a railroad spur and frontage road have been provided. With the completion of the interstate, the commission will begin construction on revised bulkheads. They presently own a crane and a "cat" for use in unloading operations and are fully operational.

The river is also an integral part of the recreational plan of the city. Boat-ownership in Sioux City has been increasing rapidly in the last several years as it has all over the Nation. Use of the river has increased to such an extent that there is now a critical shortage of moorage and launching ramp space. In response to this demand, the State and city have already spent $13,000 and in 1960 will spend an additional $20,000 providing moorage and ramp facilities on the Big Sioux River at its confluence with the Missouri.

The level of the Missouri controls the usefulness for boating and moorage of the Big Sioux for more than 5 miles from its mouth. The economic impact of boating in a metropolitan area of 100,000 is difficult to estimate, but it is considerable. Reasonable summer river levels are essential to the existence and growth of this type of recreational and economic development.

Riverborne transportation is essential to continued prosperity on the farms in the area tributary to Sioux City. The impact of freight rates in this regard have been documented in other presentations here today. This prosperity of the farmer and his local community is the lifeblood of prosperity for Sioux City. The planning commission has just completed a comprehensive survey which describes the local economy in the nomenclature of the Federal income and product accounts and their familiar gross national product figures.

The survey indicated that in 1958 there were 4,801 persons employed in the manufacturing of food products in Sioux City. They added almost $53 million to the local economy which was 25.9 percent of all economic activity in the city. The effect of this activity works both ways, the prosperity of the farms creates prosperity for the city, and the existence of the city as a good processing center contributes to the prosperity of the farmer.

The wholesale and retail trade of the city likewise depend on the farm country for the margin of business that spells prosperity. In 1958 these two activities employed 9,486 people and did a business that produced a value added of $47 million. Twenty-one million of this value added was from business done with the trade territory which is dependent upon farm prosperity. This represents 43 percent of the total business of wholesale and retail combined.

We believe that the farmer's ability to get his product to market in an economical manner is essential to his prosperity and that the prosperity of the farmer is essential to the prosperity of Sioux City. A navigable Missouri is essential to the future prosperity of both.

Senator CASE. Thank you very much, Mr. Austin.
Mr. Wimmer.

STATEMENT OF GEORGE R. WIMMER, MANAGER, INDUSTRIAL DEVELOPMENT COUNCIL, SIOUX CITY, IOWA

Mr. WIMMER. Honorable Senators, Governor Herseth, my name is George Wimmer. I am with the Industrial Development Council, Inc. of Sioux City. I have been in this position for the last year. Prior to that time I was with the Iowa Development Commission as industrial promotions director. So I do have a bit broader perspective on this thing than just representing one community.

I think I can sum up this entire paper by saying that the entire Midwest has been cognizant and has been trying to do something about its loss of population in the movement from the farm, from rural area to the cities which has been brought about by the agricultural advances.

Now, throughout our State of Iowa, and I am sure in these other areas we export a lot of people every year. We figure 2,000 farm families leave the farm each year in Iowa. A lot of people think these are retired people going to California. It is not the case. What is happening, our young people that we invest in, invest our tax money in to educate, leave the borders of the State, go to industrial centers for jobs. I am sure the good Governor here is familiar with the amount of money that crosses the border every time one of these young people leaves.

What we are trying to do in Sioux City is increase the industrial base, trying to broaden the tax base.

I think if you will just briefly look at the last page, the illustration, you will see that a great deal of our effort has been centered around and is developing along the Missouri River due to the potential this stream holds out to us. Most of these people at the present time that have been interested in this project and are interested in locating in our area are connected with agriculture. They are the grain people. Those shipping inbound products would primarily be fertilizers, molasses, and other products that would be ultimately consumed on the farm. We need this river desperately in attracting industry and broadening our industrial base and providing jobs for the people of this area.

Thank you for this opportunity. It has been a pleasure being here.

Senator CASE. Thank you very much, Mr. Wimmer. I can assure you that there is nothing that is more inspiring to members of the Senate Select Committee on Water Resources than this work which they are seeking to do in the several States of the country that they may make a contribution to the providing of opportunities for young people. If you could all have been present last night when we were at Redfield and the distinguished chairman, Senator Kerr, was called upon for some remarks he made that the burden of his remarks, speaking about the growth of population and yet the way

many of our Midwestern States were not providing the opportunity for these young people to live in their own States after they had become educated and were exporting too many of them. That is one of the things we want to help answer in providing better opportunity in our home States.

(The prepared statement follows:)

STATEMENT BY GEORGE R. WIMMER, MANAGER, INDUSTRIAL DEVELOPMENT COUNCIL, SIOUX CITY, IOWA

Within recent years, State and local organizations in the Midwest have been alarmed at the loss of population from their areas which has been brought about by mechanization and technological advances in agriculture. The State of Iowa estimates that for the past 5 years 2,000 families per year have left farming for other forms of employment. It is also estimated that approximately 27,000 people per year have been forced to leave the State of Iowa in search of job opportunities in more concentrated population centers.

Not only Iowa, however, but other States whose economies are primarily based on agriculture have this same problem. The States of South Dakota, North Dakota, and Nebraska reflect this problem even more vividly than Iowa due to their greater dependence upon agriculture. This dependence and its effect upon the economy is reflected in per capita effective buying income figures for the respective States. South Dakota, which has the least industry of those listed, had a disposable income of $1,306 per person in 1957; Nebraska, due to her greater diversity, reported $1,479; Iowa, being even more highly industrialized, reported 1,539; Minnesota reported $1,616; and Illinois, with its great concentration of industry, reported $2,095. The U.S. average for 1957 was $1,734.

In a recent study of the Sioux City market area, which includes counties of 4 States, it was found that of 46 counties in the area, 32 lost population between 1940 and 1950. In every case, the counties which gained population are also the counties which have been able to increase their industrial base.

Having worked on the problem of industrial development over the past several years as a member of the Iowa Development Commission, it has often been my experience to find that the area being discussed today lost factories due to one major factor—freight rate penalties. Studies show that the eastern fourth of Iowa, where water compelled rates are in effect, is growing at an appreciably greater rate than our area.

Gerald L. Nordquist, State University of Iowa economist, in a research report of July 1959, published in the Iowa Business Digest, stated, "A lack of basic nonfarm industry will continue to slow the production, income, and population growth of northwestern Iowa in comparison to the rest of the Nation. Although it has 30 percent of Iowa's land area and 23 percent of the State's population, northwest Iowa in 1954 accounted for only 12 percent of the State's manufacturing employment, a proportion that hasn't changed since World War I.

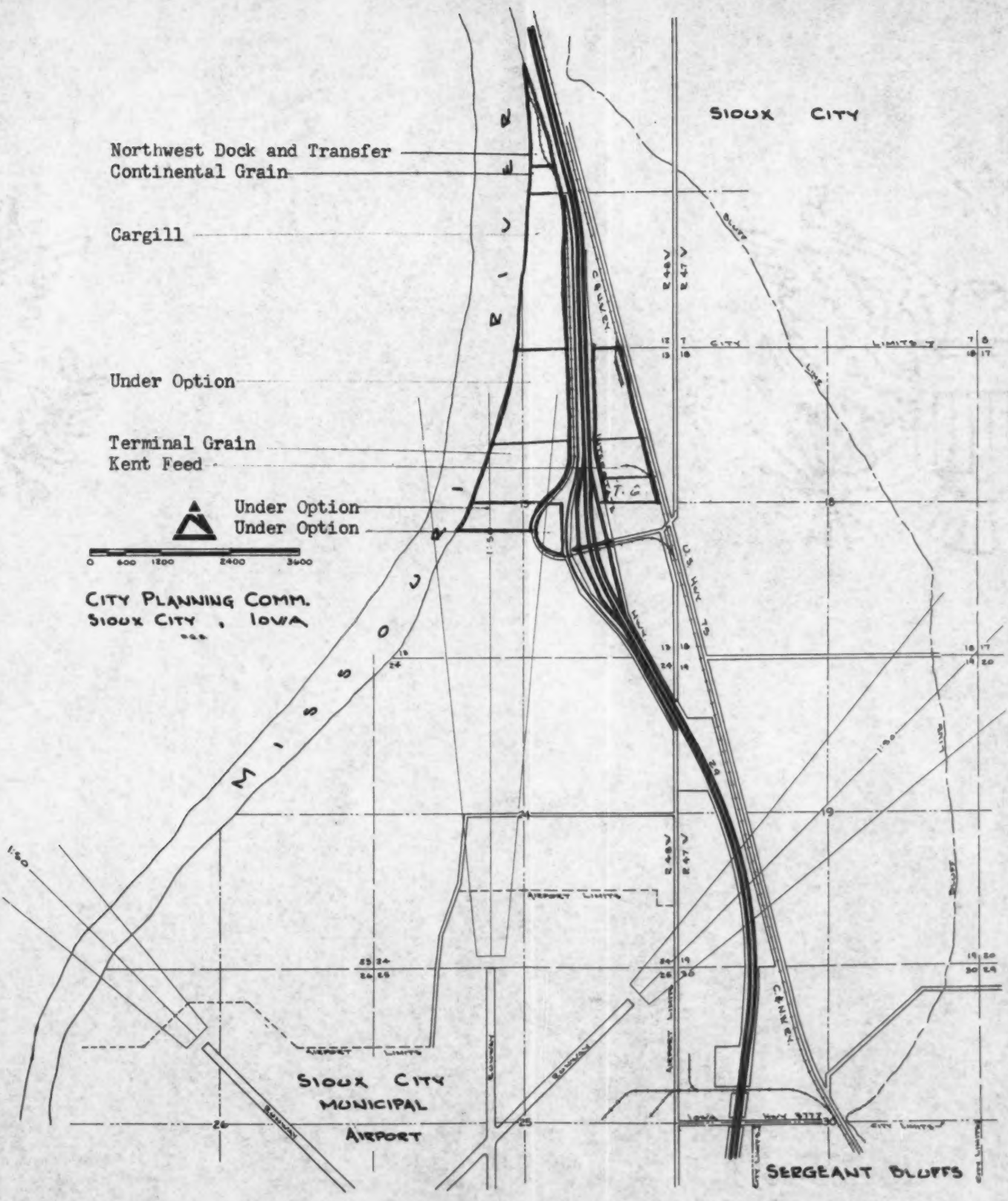
"Because of the industrial imbalance, this area is particularly vulnerable to the short- and long-run changes and adjustments which inevitably accompany economic growth in this country.

"Not only is manufacturing activity generally sparse in northwest Iowa, but that which does exist is mostly farm related and closely tied to the up-and-down fortunes of agriculture.

The combined production of feeds, fertilizers, farm equipment, food, and similar products account for three-fourths of all the manufacturing employment in northwest Iowa."

These statements, it is believed, are as true for adjacent areas in the neighboring States of Nebraska, South Dakota, and Minnesota as they are for northwest Iowa alone. It is vital that the communities in the area of the Missouri River receive further reduction in transportation costs in order to compete effectively for new industry.

Within recent months, the Industrial Development Council of Sioux City has been contacted by numerous major manufacturers interested in locating either factory or warehousing facilities in this area when full-scale barging operations can be successfully maintained on the Missouri. Already (refer to illustration I) several major firms have purchased sites along the river. In order to locate these industries, facilitate construction of operating units, and bring them into production, it is essential that we are able to offer them the longest possible



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barging season. At this time, the primary commodities which would be shipped downriver are grain and other agricultural products. However, manufacturers of diversified products, ranging from steel to chemicals, are interested in using the river for inbound shipments.

It might be stated that the problem in our area is similar to that of agriculture areas in the South where the well-known balance, agriculture with industry programs, have been instituted. We are endeavoring through our own initiative and effort to forestall any further deterioration of our area's economy so that major Federal grants and assistance will not be required in the future.

If we are to be able to meet the needs of this vast agricultural area and diversify our economic base through additional nonagricultural employment, it is essential that the full and far-reaching effect of the development of the Missouri River for navigation purposes be recognized and promoted.

It is definitely my opinion that the entire area being discussed here today would benefit in direct relation to the rapidity and degree with which the Missouri River is developed for navigational purposes. It is essential for the economic well-being of our several States that new job opportunities be provided at the earliest date. In order to accomplish this end, we must have competitive transportation costs and a water outlet to national and international markets through the inland waterway system. The Missouri River offers promise of this being fulfilled now.

Senator CASE. That completes the witness list as it has been submitted to the clerk. If there should be anyone present who wants to file a statement with the committee, it can be mailed to my office at Pierre, at the St. Charles Hotel, or if any of you want to submit any data later it can be submitted to the committee in Washington. We want to express our appreciation to the people locally who have contributed to arranging for the hearing, those who made the arrangements for the use of the Washington High School, to the mayor, to the manager of the chamber of commerce, Mr. Olsen, and others who had the arrangements made for the hearing.

Are there further comments or observations by the chairman?

The CHAIRMAN. I wish to express my appreciation to the people who have come here and given us the benefit of their views, their information, and their recommendation. In my judgment this is democracy at work. We are confronted with a mighty problem. Your Government is seeking to solve it. Your testimony and that of thousands of witnesses across the length and breadth of this Nation is going to provide us with the information which will at least put us in much better position to intelligently consider and decide than we could possibly have done without it.

I want to say, Senator Case, that we have been in no State whose people have responded more effectively and more intelligently and more vigorously than have your people here, as well as those from the neighboring States that have come and given us the benefit of their information.

Senator CASE. Thank you, Senator.

Senator Hart?

Senator HART. Except to add my word of appreciation for the many kindnesses.

Senator CASE. Governor?

Governor HERSETH. I might just explain, Senator Case, because of your courtesy in giving me another minute, it will be impossible for me to go to the dinner and I might ask you, Senator Case, to explain why there and I will explain to this group. At 2:30 this afternoon we do have a short ceremony on the Oahe Dam structure at which Colonel Hammond of the Corps of Engineers has asked me

to be present and I can make it by skipping lunch and therefore I will, and I ask that you forgive me for that reason. If you will mention that to the people who asked me to dinner.

Senator CASE. We will. I would skip lunch myself if I could be there, but I have other engagements.

I want to thank all of you for coming and being present. I would like to note the presence of all of you. But I do see State Senator Anderson who is one of the better members of the State legislature. Senator Anderson, won't you stand up? I like to have your presence noted.

Mr. ANDERSON. Thank you, Senator.

Senator CASE. Thank you all for being here.

The hearing is adjourned.

(Whereupon, at 12:10 p.m., Wednesday, October 28, 1959, the hearing was adjourned.)

(Subsequent to the close of the hearing the following statements were received for inclusion in the record:)

STATEMENT OF DONALD NAUGHTON, SECRETARY-TREASURER, DAKOTAS ELECTRIC COOPERATIVE, INC., BISMARCK, N. DAK.

Mr. Chairman and members of the committee, my name is Donald Naughton from Agar, S. Dak. I am secretary-treasurer of Dakotas Electric Cooperative with headquarters in Bismarck, N. Dak. Dakotas Electric is a power cooperative whose responsibility is to generate and/or purchase and transmit electrical power and energy to its 14 member cooperatives who are located in southwestern North Dakota and northwestern South Dakota. Our cooperative serves approximately 27,000 consumers over an area of approximatley 40,000 square miles. The density of consumers per mile of line on our member distribution cooperatives is near the lowest in the Nation.

The area served by Dakotas Electric was one of the last areas in the Nation to receive central station service due to the fact that it was difficult to prove feasibility to REA.

In 1948 when Dakotas Electric was organized U.S. Bureau of Reclamation power from the Missouri River mainstem dams just beginning to come out of the planning stage and into the use stage. At that time there was no doubt in anyone's mind that U.S. Bureau of Reclamation power would ever be in short supply. Today the story is quite different, since the Bureau of Reclamation has indicated that there will not be enough Bureau of Reclamation power to serve the preference customers' needs beyond 1963.

In 1948 REA finally agreed to grant us a loan on the basis of an abundant supply of Bureau of Reclamation power and if we used the loan to make improvements in the facilities of a utility in the area who in turn agreed to transmit this Bureau of Reclamation power to the members of Dakotas Electric free of wheeling and losses.

Dakotas Electric loads are continuing to grow while the supply of low-cost Federal power is nearing an end. It is predicted that by 1970 our system will be short 45,000 kilowatts over and above what has been and will be allocated by 1965. By 1980 we shall be deficient 147,000 kilowatts.

The Dakotas Electric board of directors has authorized me in their behalf to submit to you this statement.

The consumers in our area are convinced that the waters of the Missouri should be used for human, animal, and plant use in that order and not be wasted according to the present practice of supporting a free running navigation channel.

In order to insure future low-cost power for our members the waters of the Missouri River must be released in a way which is more compatable to the majority of people and not for the privileged few. If this water is released according to the power requirements, high releases during winter when loads are up and lower releases in summer when loads are down, it will not only meet our needs but also the needs of municipalities as well as Mississippi navigation requirements.

The members of Dakotas Electric are also in favor of increased irrigation in our area since there are several direct as well as indirect benefits to our cooperatives.

(*a*) More farm units.
(*b*) More stable farm units.
(*c*) Better future for REA.

There are two solutions apparent to us which we would like this committee to take under advisement.

1. Slack water navigation.
2. Exploration of underground water and supplies.

Slack water navigation will give us the following benefits:

(*a*) Increase the firm power of the present or future Federal hydropowerplants which will further increase the benefits of low-cost hydropower to all the preference consumers in the area as well as increase the revenues from these projects.

(*b*) A slow moving river will increase navigation traffic on the river and thereby give more people the benefits of the lower cost transportation.

(*c*) The banks of the Missouri River will become stabilized.

(*d*) A stabilized river will mean more recreational activity.

(*e*) Conserve water which is a valuable resource.

EXPLORATION OF UNDERGROUND WATER SUPPLIES

New sources of underground water will increase irrigation activities and will indirectly benefit REA which has already been pointed out. In addition to this benefit large underground water supplies can be used to support large lignite burning electrical powerplants. As has been pointed out the Dakotas Electric system will be deficient 147,000 kilowatts by 1980 and in order to keep power cost low we must locate future thermal plants on the mine mouth. This can only be done if there is a nearby source of abundant water.